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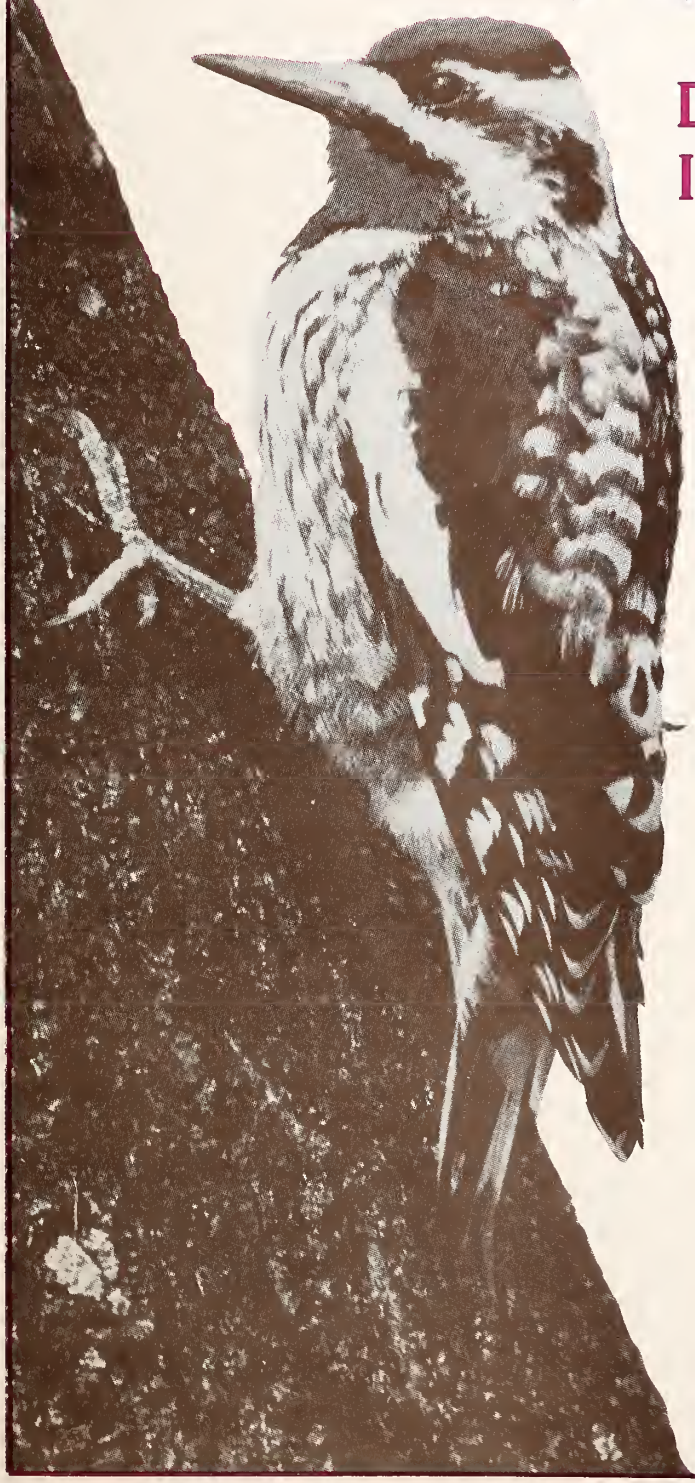

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PROJECT M 8103(4)

RESERVE STREET - U.S. 93 TO SOUTH THIRD STREET
MISSOULA, MONTANA

DRAFT ENVIRONMENTAL IMPACT/4(f) STATEMENT

STATE OF MONTANA
DEPARTMENT OF HIGHWAYS

AND

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

Submitted pursuant to 42 U.S.C. 4332 (2) (C), 23 U.S.C. 128(a),
23 U.S.C. 138, 49 U.S.C. 303, 42 U.S.C 7401

John L Wicks

For Gary Wicks
Montana Department of Highways

Date: June 18, 1984

Reviewed for Content and Approved
for Circulation by FHWA

William S Dunbar

Federal Highway Administration

Date: June 18, 1984

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ABSTRACT OF E.I.S.

This Environmental Impact Statement addresses the impacts related to the reconstruction of a 2.1-mile section of Reserve Street from U.S. 93 to South Third Street in Missoula, Montana. This project is a part of the continuing improvement of Reserve Street from U.S. 93 to Interstate 90 and is the first four-lane segment of Reserve Street. The project consists of acquiring additional right-of-way and improving the existing narrow two-lane facility to a four-lane highway. The primary concerns of this EIS include the impacts on the residents who will have to be relocated in order to acquire sufficient right-of-way to construct the proposed new highway, and the impacts of increased traffic on the residents who will remain along Reserve Street. The alternatives that were evaluated include no-build, two-lane, three-lane, and four-lane alternatives. The no-build, two-lane and three-lane alternatives were not capable of handling the proposed traffic, which left the logical choice to one of the four-lane alternatives. Little or no opposition to a four-lane highway had been expressed during the public meeting process, and there were no other identified obstacles to the selection of a four-lane alternative. However, several areas of controversy were identified during the development of the project which included project costs, noise and air quality impacts, and relocation impacts.

COMMENTS

Comments on this draft Environmental Impact Statement are due by Aug. 20, 1984, and should be sent to Mr. Stephen Kologi at the above address.

SUMMARY

SUMMARY

A. PROJECT DESCRIPTION

This Environmental Impact Statement/Section 4(f) Evaluation contains an examination of the proposed improvement of Reserve Street (FAU 8103) on the western edge of Missoula, Montana. The Project [M8103(4)] extends northward from U.S. 93 (FAP 7) to its northern terminus at South Third Street (FAU 8102), a distance of approximately 2.1 miles. This project provides for the continued improvement of Reserve Street from Interstate 90 to U.S. 93 (Brooks Street). The proposed project would improve the last remaining section of Reserve Street between these two major routes and would facilitate the increasing amount of through traffic which has utilized the roadway since the completion of the Clark Fork Bridge in 1979.

The proposed project would replace a twenty-foot-wide roadway that was originally constructed in 1955. This roadway has been repaired and modified somewhat since its construction; however, the facility is presently in a deteriorated condition and is considered inadequate to safely handle current and projected traffic volumes in this growing area of the community.

The initiation of a project along this urban route was motivated by several factors:

* The age and condition of the existing facility make it impractical to continue to use the roadway without major construction improvements;

* Traffic accident records indicate that personal injuries and property damage are excessive; and

* Current and projected traffic volumes and composition cannot be handled efficiently and safely by the existing roadway.

B. ALTERNATIVES CONSIDERED

As subsequent Reserve Street improvement projects were constructed to the north of South Third Street in 1968 and the late 1970's, preliminary engineering work was initiated for the section of Reserve Street covered by this project. Preliminary environmental studies, design plans and right-of-way plans were prepared for an 88-foot-wide four-lane facility. Over the years, funding constraints, increased construction cost projections, and changes in local, state and federal regulations have required modifications to the preliminary design proposal. Due to these factors, additional alternatives were developed for further study by the Montana Department of Highways, Missoula Technical Advisory Committee, and the Consultant.

Consideration was also given to utilizing Transportation System Management (TSM) activities to maximize the utilization and efficiency of the existing roadway. Although this alternative would temporarily improve the operating characteristics of the roadway, such measures would not provide an acceptable level of service for projected traffic volumes in the design year (2005). Existing residential and commercial development in the area does not warrant additional public transportation services or facilities at this time.

The alternatives that were developed and considered appropriate for this EIS are described in the following narrative. All alternatives except the no-build alternative would require that additional right-of-way be acquired from the west side of Reserve Street to accommodate the new facility. Small amounts of right-of-way would also be required for intersection widening at Brooks Street, South Avenue and South Third Street. All build alternatives would include curb and gutter with storm drainage facilities and provisions for pedestrians and bicyclists over the length of the project. The facility would be constructed as a limited access facility; however, existing accesses to residential, commercial

and public uses and to dedicated public streets and alleys would be maintained. No parking along the roadway is planned for any of the alternatives, according to local governmental authorities.

Alternative No. 1: An 88-foot-wide four-lane roadway consisting of two 12-foot driving lanes, two 14-foot driving lanes, a 16-foot painted median, and two 10-foot shoulders as originally proposed by the Montana Department of Highways.

Alternative No. 2: A 74-foot-wide four-lane roadway consisting of four 12-foot driving lanes, a 14-foot painted median, and two 6-foot shoulders as recommended by the Missoula Transportation Technical Advisory Committee.

Alternative No. 2A: A four-lane roadway similar to Alternative No. 2 except that the shoulder width would be increased to 10 feet instead of 6 feet, resulting in an 82-foot-wide roadway section.

Alternative No. 3: A 58-foot-wide improved two-lane roadway consisting of two 12-foot driving lanes, two 10-foot shoulders, and a 14-foot center turning lane to accommodate local traffic.

Alternative No. 4: A 44-foot-wide two-lane roadway consisting of a 12-foot driving lane and a 10-foot shoulder in each direction. This section would be widened at major intersections to handle turning movements.

Alternative No. 5: The no-build alternative would leave the existing 20-foot-wide facility in its present state.

C. PREFERRED ALTERNATIVE

The four-lane alternatives are the only alternatives that are capable of adequately handling the traffic that is projected for Reserve Street. The four-lane alternatives have minor differences in environmental impacts and in the ability to serve the traffic demands. The primary evaluation criterion was therefore determined to be cost. The 74-foot four-lane is judged to be the minimum facility that will adequately handle the projected traffic, and is the preferred alternative since it will be the least costly.

The 74-foot alternative has two 12-foot driving lanes and a 6-foot shoulder in each direction, and a 14-foot painted median. The 6-foot shoulders will be used as bikeways, and no parking will be allowed on the shoulders. Sidewalks will be provided on both sides of the roadway except for the area adjacent to the golf course. Additional right-of-way

will be required at Brooks Street, South Avenue and South Third Street.

The selection of the preferred alternative was made jointly by local government officials, the Montana Department of Highways, and the Federal Highway Administration. Final selection will not be made until the results of the EIS circulation and the public involvement process have been fully evaluated.

D. SIGNIFICANT ENVIRONMENTAL IMPACTS

The significant impacts of the preferred alternative are as follows:

* The improved highway will be able to accommodate present and projected traffic volumes at a reasonable level of service;

* Traffic safety will be improved with a significant decrease in accidents expected on the new highway due to improved facilities;

* Pedestrian traffic will benefit from the installation of new sidewalks along the highway where there are none at present;

* Bicycle traffic will be improved through the use of the six-foot shoulders on the highway where there are no facilities presently available;

* Development along Reserve Street and in adjacent areas is expected to increase due to better access to the area. The area immediately adjacent to Reserve Street is expected to continue the change in land use from residential to commercial.

* There are noise levels at several locationsalong the corridor which presently exceed FHWA noise level criteria. The noise levels in residential areas adjacent to Reserve Street are expected to exceed the FHWA recommended maximum of 70 dBA by the design year. Noise levels for commercial areas adjacent to Reserve Street are not expected to exceed recommended maximum levels by the design year.

* There will be substantial right-of-way acquisition and relocation impacts to families living on the west side of Reserve Street;

* Air quality along Reserve Street is expected to improve due to fewer traffic delays on the preferred alternative than at present;

* Access to Reserve Street will continue to be a problem. However, the preferred alternative is a four-lane roadway which will provide better gap opportunities for access onto Reserve Street than the existing two-lane facility.

* The taking of playground area at the C.S. Porter School will be an impact. However, this impact will be mitigated by providing replacement property immediately adjacent to the playground area.

E. SIGNIFICANT ISSUES AND AREAS OF CONTROVERSY

The primary areas of controversy that were identified during a series of public meetings are: 1) the adjacent property owners contend that the increased traffic along Reserve Street has lowered their property values; 2) the noise levels and air quality along Reserve Street make the area an undesirable place to live; and 3) the timetable for right-of-way acquisition and construction is too slow.

F. ISSUES TO BE RESOLVED

The primary issue to be resolved is the amount of right-of-way to be acquired. For the purposes of this EIS, the amount of right-of-way required to construct the 88-foot alternative as originally proposed by the Department of Highways was expected to be acquired regardless of the alternative chosen. It has been suggested that the right-of-way purchase be reduced since a narrower four-lane option has been selected as the preferred alternative.

G. ACTIONS REQUIRED BY OTHER AGENCIES

No actions are required by a state or federal agency other than the Montana Department of Highways and the Federal Highway Administration.

H. OTHER SIGNIFICANT GOVERNMENT ACTIONS

There are no other significant actions proposed by other government agencies along the highway corridor of which we are aware. However,

there is substantial controversy on the zoning along Reserve Street, and the potential exists for modifying the zoning, which would be an action that would be taken by the Missoula County Commissioners.(1)

REFERENCES FOR SUMMARY

1. Mike Kress, Missoula Planning Office, in a personal communication, March 8, 1984.

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PART I: PURPOSE AND NEED

PART I: PURPOSE AND NEED

A. DESCRIPTION OF PROJECT

Reserve Street is a major north-south arterial located on the west side of Missoula, Montana extending from Interstate 90 at the north end of the street to Thirty-ninth Street at the south end. The portion of Reserve Street that is addressed in this project is the section from South Third Street to U.S. 93, a distance of 2.1 miles. U.S. 93 (Brooks Street) is a four-lane facility that serves traffic to and from the Bitterroot Valley and provides access to one of Missoula's major commercial districts. Between South Third Street and I-90, Reserve Street is a two-lane roadway constructed on four-lane right-of-way in a predominantly commercial and industrial area of Missoula. Figure No. 1 shows the project area and location. Photographs 1 through 6 depict existing conditions in the Reserve Street area.

Reserve Street is on the Missoula Federal Aid Urban System and is designated F.A.U. 8103. The section of highway in this project was designated as a Federal Aid Secondary Highway in July, 1955, and was placed on the Federal Aid Urban System in May, 1974. The existing highway is a 20-foot-wide two-lane paved street with dirt shoulders except at the intersections of U.S. 93, South Avenue, and South Third Street where the roadway has been widened to accommodate left turn lanes and curb and gutters have been installed.

Based on 1983 traffic count data seasonally adjusted to Annual Average Daily Traffic (AADT), traffic counts along Reserve Street vary from 13,360 vehicles per day near U.S. 93 to 13,890 vehicles per day near South Third Street. Traffic modeling that was done in 1974 shows a rate of traffic growth that would result in an increase to about 22,000 vehicles per day by the year 2005.

The primary objectives of this street improvement project are to:

* Provide a serviceable arterial route to connect U.S. 93 to Interstate 90 on the west side of Missoula.

* Reduce traffic congestion and improve travel comfort and convenience by providing an adequate facility for present and future design year traffic.

* Reduce accidents and improve the safety characteristics of the street by improving the physical characteristics of the highway.

* Provide facilities for pedestrians and bicyclists where none exist at present.

B. HISTORY OF PROJECT

The Reserve Street project originally encompassed the length of Reserve Street from U.S. 93 to Mullan Road (FAS 263), and was later extended northward to Interstate 90. In 1968, the two-mile section from Mullan Road to I-90 was constructed as a two-lane roadway. This section includes a railroad grade separation and an interchange at Broadway, and an interchange at I-90. Right-of-way for a future four-lane for this section of Reserve Street was purchased at that time. With the completion of the Clark Fork River Bridge in 1979, arterial traffic was able to utilize the entire length of Reserve Street.

The section of Reserve Street from South Third to Mullan Road was improved as a two-lane roadway in several projects between 1975 and 1978. This section included a bridge over the main Clark Fork River, a bridge over an overflow channel of the river, and a railroad grade separation. Right-of-way for a future four-lane for this section was also purchased at that time.

The remaining section of Reserve Street, which this project covers, extends from U.S. 93 to South Third, a distance of about two miles. This section has been in design status for a number of years and the road

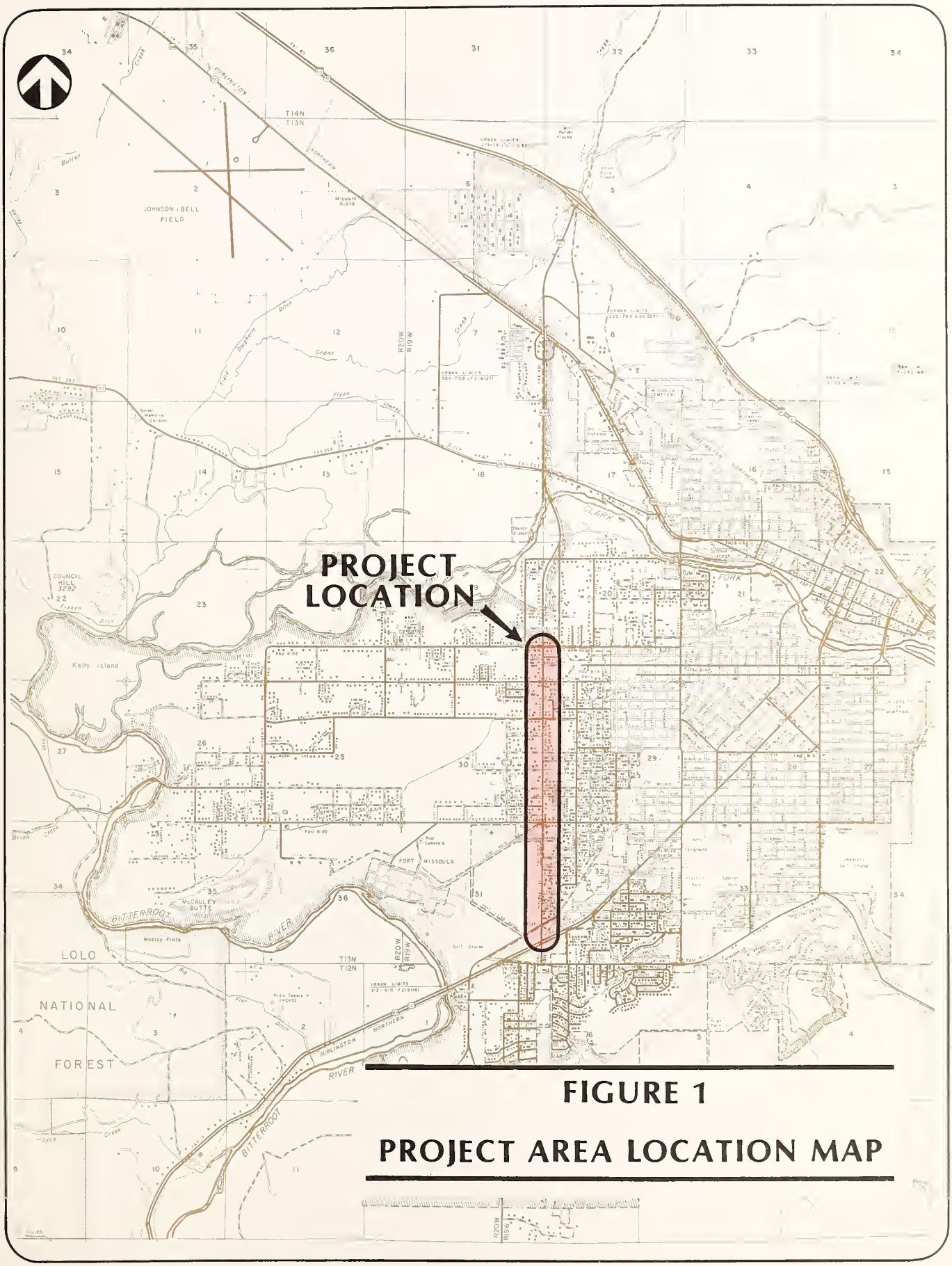


FIGURE 1

PROJECT AREA LOCATION MAP

Photograph 1 —

Looking south along Reserve Street toward the intersection with U.S. 93 (Brooks Street). Photo taken at intersection of Old U.S. 93 and Reserve Street. Note signalization and BNRR crossing at intersection.

Photograph 2 —

New sanitary sewer lift station on west side of Reserve Street adjacent to municipal golf course. Fence at left is east boundary of golf course property.

Photograph 3 —

Looking north along the east side of Reserve Street near the entrance to Rosauer's Supermarket. Note C.S. Porter playground at left and school crossing warning lights and signs.

Photograph 4 —

View to the south in the vicinity of the North Avenue intersection. Note school crossing facilities and commercial development to the east of Reserve Street.

Photograph 5 —

Looking north along Reserve Street from the Sunset Lane intersection. Irrigation canal along this section of the project will be relocated to the west and replaced by a concrete-lined ditch.

Photograph 6 —

View to the south of the Spurgin Road intersection. Note roadside vegetation near the private access at right and the low density of residential development common to this portion of the project area.

plans and right-of-way plans for an 88-foot roadway are essentially complete. Controversy surrounding this project has increased in the last few years, especially in regard to the need for the wide section, noise, air quality, and relocation impacts. In order to arrive at an informed decision regarding these questions, it was decided to do additional design and environmental studies.

C. PURPOSE AND NEED

This project encompasses the last remaining portion of Reserve Street with a 20-foot wide roadway between Interstate 90 and U.S. 93. Since the bridge over the Clark Fork River was completed in 1979, the importance of Reserve Street as a major north-south connecting link has continued to increase. As sections of Reserve Street were improved and upgraded, the roadway's ability to handle additional traffic has also been increased. At the present time, the higher traffic volumes accommodated by the wider 44-foot two-lane facility north of the project area are unable to utilize the existing narrow roadway without creating traffic congestion. The proposed project would offer improvements which would relieve such congestion and facilitate movement between Interstate 90 and U.S. 93 and ultimately result in a reduction of travel time, delays, and energy consumption.

Traffic volumes along this section of Reserve Street are presently about 13,500 vehicles per day and are expected to continue to increase steadily in the future. An indication of the ability of Reserve Street to handle traffic during peak periods is illustrated by the fact that traffic at the major signalized intersections of this section of Reserve Street often backs up as much as one-half mile on all approaches. As a result of this congestion, motorists must often wait for several cycles.

The role that Reserve Street serves in the overall transportation network of Missoula was identified in previous transportation planning efforts by state, city and county officials, and the local citizenry. The Urban Transportation Plan For Missoula completed in 1967 in conjunction with the Comprehensive Development Plan For Missoula, classified Reserve Street as a primary arterial and projected that traffic volumes would range from 6,400 to 11,300 vehicles per day by 1985.(1) This plan also recommended improvements for Reserve Street between South Third Street west and U.S. 93 which included the acquisition of additional right-of-way and the construction of a four-lane divided highway to replace the existing facility. Since the Urban Transportation Plan was completed, studies have periodically been prepared to supplement existing traffic data for Missoula's transportation network.

Residential and commercial development has continued to increase in this urbanized area adjacent to the western edge of Missoula. Major public traffic generators constructed in the Reserve Street area during recent years include Community Hospital, Big Sky High School and the Rosauer's Supermarket. The Missoula Planning Office recently completed a population analysis for Missoula County which indicated that the population in Missoula and Missoula County increased by 13.2 and 30.5 percent, respectively, between 1970 and 1980.(2) In addition, the population of the urbanized areas adjacent to the city increased by nearly 20 percent over the same period.

Commercial development has also continued along Reserve Street, and City and County planning efforts have recognized the potential for commercial development in the area. Planning documents indicate that as traffic volumes increase, commercial development likewise increases. Future commercial development along portions of Reserve Street is consistent with both comprehensive planning and zoning regulations for the area.(1) Development plans have also been proposed for an area north of the Reserve Street interchange at Interstate 90 known as Grant Creek. This proposal would involve both residential and commercial development in two areas adjacent to Grant Creek Road, and may ultimately account for traffic volume increases of more than 11,500 vehicles per day.(3) These trends toward future residential and commercial development of the area will impact the existing transportation system and will require highway improvements to meet future transportation needs.

In addition to traffic congestion, this portion of Reserve Street has a high accident rate. Between October 1, 1980 and September 30, 1983, more than 200 reported accidents occurred on Reserve Street and in intersections and accesses along the route. This high number of accidents may be attributed to high traffic volumes, narrow pavement width, lack of lighting and lack of access controls. Nearly 80 percent of the accidents occurred at intersections or driveway accesses where vehicles were attempting to make left turns or stop for traffic. A potentially dangerous situation exists for pedestrians and bicyclists who must share the roadway facility with motor vehicles. The proposed project will improve these conditions by: limiting access along the corridor; providing left turn lanes or channelization at intersections; separating traffic through the use of a median; improving lateral clearances by the use of a paved shoulder; and providing pedestrian and bicyclist facilities over the length of the roadway.

D. IDENTIFICATION OF SIGNIFICANT ISSUES

1. SCOPING MEETING

A four-hour workshop session and evening meeting were held on September 22, 1983 at the National Guard Armory Building, 2501 Reserve Street, in Missoula, Montana specifically to identify significant issues.

The workshop session offered an opportunity for interested parties to discuss the project on an informal basis with representatives of the Montana Department of Highways, the Federal Highway Administration, and the private engineering firm, Robert Peccia & Associates, that is preparing the Environmental Impact Statement for the Montana Department of Highways. Ten people, most of whom were landowners adjacent to or near Reserve Street, attended the workshop session.

An evening meeting, which also took place at the National Guard Armory, was held at 7:30 p.m. At this meeting the engineering firm explained the purpose of the scoping process, the time schedule for the Reserve Street EIS, and the major studies that would be conducted for the EIS. Twenty-one people attended the evening meeting. Comments were received orally, and forms were provided in the event the people attending wanted to submit written comments. Eighteen written comments were submitted by October 7, 1983.

The Scoping Meeting was advertised on four radio stations (KGVO, KUFM, KYLT, and KYSS) and in the Missoula newspaper. The newspaper advertisement consisted of a legal advertisement published for four consecutive days before the meeting, two classified advertisements published two consecutive days before the meeting, and a bordered advertisement published the day of the meeting. In addition, the Montana Department of Highways sent out a notice of the meeting to all agencies on their list of interested parties.

2. REVIEW OF PROJECT HISTORY FOR RESERVE STREET

The Montana Department of Highways has extensive files on Reserve Street dating from approximately 1958 to the present. These files were reviewed to determine the historical evolution of the Reserve Street Project, and to determine concerns which were identified earlier. The primary content of these files were: 1) letters and reports prepared by the Montana Department of Highways; 2) Missoula Transportation Technical Advisory Committee (TAC) meeting minutes; and 3) letters

from people or agencies that would be affected by or have jurisdiction over the project.

These files were used to determine the engineering studies and designs that have been done to date, and previous commitments that have been made. Also the comments and concerns in the files were noted, and used to supplement the comments received during the scoping meeting held September 22, 1983 to identify significant issues that should be addressed in the EIS process.

3. IDENTIFICATION OF SIGNIFICANT ISSUES

The scoping meeting and review of the Reserve Street files revealed a number of issues that are of concern to the residents of the area near Reserve Street and to the local officials. The approach used to identify significant issues was to identify every issue that was judged to be pertinent and reasonable, and to categorize the concerns into specific topics that could be addressed in a logical fashion in the EIS. The more often an issue was discussed and the stronger the conviction on the issue, the more significant it was considered to be. The following table shows the significant issues that were identified.

TABLE NO. 1

IDENTIFICATION OF SIGNIFICANT ISSUES

MAJOR SIGNIFICANT ISSUES

1. Traffic Noise Impacts on Adjacent Properties
2. Commercial Development, Land Use, and Zoning Along Reserve Street
3. Traffic Congestion, Delays, and Number of Lanes Required
4. Traffic Safety
5. Air Pollution From Traffic

MODERATE SIGNIFICANT ISSUES

6. Pedestrian and Bicyclist Facilities and Safety
7. Parking and Access Along Reserve Street
8. Provisions for School Children Crossing Reserve Street
9. Time Schedule and Cost of Project Completion
10. Splitting of Adjacent Property Parcels Into Non-usable Parcels During R/W Acquisition
11. 4(f) Impacts (Taking of C.S. Porter School Playground)

MINOR SIGNIFICANT ISSUES

12. Irrigation Ditch Relocation
13. Conflict With Sanitary Sewer
14. Provisions for Buses
15. Use of Reserve Street by Emergency Vehicles
16. Coordination between State and Local Officials
17. Littering Along Reserve Street

REFERENCES FOR PART I

1. Urban Transportation Plan, Missoula, Montana, Clark, Coleman, Rupeiks, Inc., 1967.

2. Missoula County Population Analysis, Missoula Planning Office, October, 1983.

3. Grant Creek Road Traffic Impact Study Draft Report, Henningson, Durham & Richardson, January, 1981.

PART II: ALTERNATIVES, INCLUDING THE PROPOSED ACTION

PART II: ALTERNATIVES, INCLUDING THE PROPOSED ACTION

A. MEETINGS ON ALTERNATIVES

In addition to the scoping meeting held in September, 1983, an afternoon workshop and an evening meeting specifically oriented towards discussion of roadway alternatives were conducted on November 16, 1983. These public meetings were utilized to discuss the results of the previous scoping meeting and to obtain comments on the proposed alternatives selected for evaluation in the Environmental Impact Statement. Notice of these meetings was advertised in the local newspaper (The Missoulian) and on four Missoula radio stations (KGVO, KUFM, KYLT AND KYSS) during the week preceding the meetings. A tape recording of the proceedings at the evening meeting is on file with the Montana Department of Highways in Helena. Written comments on the selected roadway alternatives were also solicited at this time.

B. ALTERNATIVES SELECTED FOR EVALUATION

Based on the scoping meeting and a review of the Montana Department of Highways files on Reserve Street, two alternatives become obvious immediately. These alternatives include the original four-lane highway designed by the Montana Department of Highways and a downsized four-lane as recommended by the Missoula TAC. In addition to these alternatives, a "no-build" alternative is required to be analyzed by law. In

order to provide a complete range of alternatives, two other alternatives which were mentioned during the scoping meeting were considered. These are a three-lane street and a two-lane street with widening at the intersections. An additional four-lane alternative was also added to provide a good range of four-lane alternatives. Typical layouts for each of the roadway alternatives are illustrated in Figure 2.

There was some discussion during the scoping process that a major highway should be constructed to the west of Reserve Street. However, Reserve Street has been designated as the major connection between U.S. 93 and Interstate 90 in all planning documents since 1965, and considerable investment has already been made in improvements on Reserve from South Third Street to Interstate 90. Further examination regarding the suggested construction of an alternate route west of Reserve Street indicates that feasible locations for such a route are not readily available. Major expenses for right-of-way acquisition, relocation of existing residents and construction difficulties due to the topography of the suggested area limit route locations. In addition, similar impacts would exist in any new route location, although different property owners would be affected. Therefore, all alternatives will utilize the existing alignment of Reserve Street.

All construction alternatives anticipate that right-of-way parcels be acquired on the west side of Reserve Street since considerably more right-of-way parcels and residential and commercial relocation would be required by an alignment shift to the east. In addition, several parcels of right-of-way have previously been purchased along the west side of the roadway by the State of Montana. The acquisition of additional right-of-way parcels will require the relocation of some property owners along the west side of Reserve Street. Intersection modifications at Brooks Street, South Avenue and South Third Street will require the acquisition of minor amounts of additional right-of-way on the approaches to Reserve Street.

During the scoping process, it was determined that provisions should be made to accommodate pedestrians and bicyclists. This view was concurred with by representatives of local and state agencies, and all roadway alternatives, with the exception of the no-build alternative, include provisions for pedestrian and bicyclist traffic. For all construction alternatives, five-foot-wide sidewalks will parallel the roadway with the exception of the area adjacent to Larchmont Municipal Golf Course. The relatively low volumes of pedestrians and bicyclists observed along this portion of Reserve Street indicated that an eight-foot-wide gravel-surfaced walkway adjacent to the golf course property would adequately serve such traffic at a cost savings. School crosswalk facilities near C.S. Porter School will continue to be provided for all alternatives under consideration. No parking would be allowed along Reserve Street for any of the alternatives.

(1) **ALTERNATIVE NO. 1: Four-Lane, 88-Foot-Wide Roadway**
This alternative consists of a four-lane roadway consisting of two twelve-foot driving lanes, two fourteen-foot driving lanes, a sixteen-foot painted median and two ten-foot shoulders. Curb and gutter with storm drainage facilities would be provided over the length of the project. This alternative was originally proposed and preliminary design plans prepared by the Montana Department of Highways.

(2) **ALTERNATIVE NO. 2: Four-Lane, 74-Foot-Wide Roadway**
This alternative would be a narrower version of the four-lane roadway which would consist of four twelve-foot driving lanes, a fourteen-foot painted median and two six-foot shoulders. Curb and gutter with storm drainage facilities would be provided over the length of the project. This alternative was recommended for evaluation by the Missoula Transportation Technical Advisory Committee.

(2a) **ALTERNATIVE NO. 2a: Four-Lane, 82-Foot-Wide Roadway**
This alternative would be similar to Alternative No. 2 and would consist of four twelve-foot driving lanes, a fourteen-foot painted median, and two ten-foot shoulders instead of six-foot wide shoulders. This alternative was selected for evaluation because of the additional safety features offered by the wider shoulder and its flexibility to handle future traffic.

(3) **ALTERNATIVE NO. 3: Three-Lane, 58-Foot-Wide Roadway**
This alternative would be a widened and improved two-lane roadway incorporating a center turning lane to accommodate the traffic characteristics of the area. The roadway would include a twelve-foot driving lane for each direction of traffic, two ten-foot shoulders and a fourteen-foot wide painted median. Curb and gutter with storm drainage facilities would also be installed over the project length.

(4) **ALTERNATIVE NO. 4: Two-Lane, 44-Foot-Wide Roadway**
This alternative consists of a widened and improved two-lane roadway with twelve-foot driving lanes and two ten-foot shoulders. This section would be widened at the major intersections to handle the turning movements. Curb and gutter with storm drainage facilities would be provided over the length of the project.

(5) **ALTERNATIVE NO. 5: "No-Build" Alternative.**
This alternative would not require any change to the existing twenty-foot wide two-lane roadway that was constructed in 1955. Improvements have been made at several intersections along Reserve Street, most notably U.S. 93, South Avenue and South Third Street; however these improvements consist of signalization and traffic channelization. The right-of-way that has been purchased for the improvement project would be held in reserve for a future improvement or sold.

FIGURE 2

TYPICAL ROADWAY LAYOUT FOR ALTERNATIVES

A listing and description of the alternatives which were identified are as follows:

ALTERNATIVE NO. 1: FOUR-LANE, 88-FOOT-WIDE ROADWAY

This alternative consists of a four-lane roadway consisting of two twelve-foot driving lanes, two fourteen-foot driving lanes, a sixteen-foot painted median and two ten-foot shoulders. Curb and gutter with storm drainage facilities would be provided over the length of the project. This alternative was originally proposed and preliminary design plans prepared by the Montana Department of Highways.

ALTERNATIVE NO. 2: FOUR-LANE, 74-FOOT-WIDE ROADWAY

This alternative would be a narrower version of the four-lane roadway which would consist of four twelve-foot driving lanes, a fourteen-foot painted median and two six-foot shoulders. Curb and gutter with storm drainage facilities would be provided over the length of the project. This alternative was recommended for evaluation by the Missoula Transportation Technical Advisory Committee.[1]

ALTERNATIVE NO. 2A: FOUR-LANE, 82-FOOT-WIDE ROADWAY

This alternative would be similar to Alternative No. 2 and would consist of four twelve-foot driving lanes, a fourteen-foot painted median, and two ten-foot shoulders instead of six-foot wide shoulders. This alternative was selected for evaluation because of the additional safety features offered by the wider shoulder and its flexibility to handle future traffic.

ALTERNATIVE NO. 3: THREE-LANE, 58-FOOT-WIDE ROADWAY

This alternative would be a widened and improved two-lane roadway incorporating a center turning lane to accommodate the traffic characteristics of the area. The roadway would include a twelve-foot driving lane for each direction of traffic, two ten-foot shoulders and a fourteen-foot wide painted median. Curb and gutter with storm drainage facilities would also be installed over the project length.

ALTERNATIVE NO. 4: TWO-LANE, 44-FOOT-WIDE ROADWAY

This alternative consists of a widened and improved two-lane roadway with twelve-foot driving lanes and two ten-foot shoulders. This section

would be widened at the major intersections to handle the turning movements. Curb and gutter with storm drainage facilities would be provided over the length of the project.

ALTERNATIVE NO. 5: NO BUILD ALTERNATIVE

This alternative would not require any change to the existing twenty-foot wide two-lane roadway that was constructed in 1955. Improvements have been made at several intersections along Reserve Street, most notably U.S. 93, South Avenue and South Third Street; however these improvements consist of signalization and traffic channelization. The right-of-way that has been purchased for the improvement project would be held in reserve for a future improvement or sold.

In addition to these alternatives, a Transportation System Management (TSM) alternative was considered for this project. This alternative would improve the existing facility by incorporating measures designed to maximize the utilization and energy efficiency of the roadway. Several TSM type activities were considered, including: 1) installation of additional approach lanes or turning bays at major intersections; 2) traffic signal modifications; 3) minor widening of the pavement area; and 4) spot lighting along the corridor. All of these modifications would temporarily improve the operating characteristics of Reserve Street; however, none of the improvements would provide sufficient capacity for anticipated traffic volumes. Complete reconstruction of Reserve Street, rather than spot improvement or continued maintenance of a deteriorated and undersized roadway, is viewed as a more appropriate expenditure of limited public funds.

The Reserve Street area is presently served by a public bus system operated by the Missoula Urban Transportation District. No stops are presently made along Reserve Street due to lack of space for bus stops and low demand for service. Conversations with the managers of the Mountain Line indicated that additional service for the Reserve Street area will be provided as warranted by future development. Provisions for bus stops along Reserve Street will be considered for all alternatives.

C. ACCESS POLICY

That portion of the Reserve Street corridor under study has been designated as a "limited access facility" by the Montana Highway Commission. Both public and private access to the roadway will be subject to the provisions of the Access Control Resolution adopted on August 20, 1981 by the State Highway Commission and the Montana Department of

Highways.[2] The provisions of this document outline the types of accesses permitted. All build alternatives will be subject to this access policy.

According to the Access Control Resolution, it has been determined that unrestricted access would impede the flow of traffic on the facility and endanger public safety. Therefore, it is necessary and desirable to limit the access onto Reserve Street. Under the terms of the Access Control Resolution access will be provided for on all public side street intersections and all public alleys. Access to all private residences and businesses shall be limited to only those parcels that can not gain access to the property from an adjacent public street or alley. In those cases where the only possible access to a private parcel is directly off of Reserve Street a single access location (driveway) will be permitted. In no case shall any parcel receive more than one access.

All of the tentative access locations, both private and public, are shown on the preliminary design of the preferred alternative in Figure No. 3.

D. PROPOSED ACTION

The evaluations that were done as part of this Environmental Impact Statement indicate that the proposed facility should be a four-lane highway. In addition, traffic analysis based on projections of design year traffic volumes indicated that three major Reserve Street intersections, Brooks Street; South Avenue; and South Third Street, need to be modified to provide an acceptable level of service. These modifications will require the acquisition of minor amounts of additional right-of-way on several approaches to each intersection. The two-lane and three-lane alternatives would not be capable of adequately handling the projected traffic volumes for the design period. In addition, the delays and traffic congestion that would be caused by the two- and three-lane facilities would result in increased air pollution.

The selection of a preferred alternative was narrowed to the four-lane alternatives. Since all of the four-lane alternatives have relatively minor differences in impacts, the selection criteria weighing most heavily were cost and use by bicyclists. The 74-foot alternative is the least-cost alternative and will provide an adequate facility for bicyclists, and was selected as the preferred alternative.

It is recognized that the selection of this alternative limits the future options since the six-foot shoulders will not allow parking to be added, and eliminates the option of striping for six lanes in the future. However, on the basis of the criteria used for selection at the present time, the 74-foot highway is judged to be the most desirable improvement for

Reserve Street and has been selected as the preferred alternative. Final selection of the preferred alternative will not be made until the results of the EIS circulation and the public involvement process have been fully evaluated.

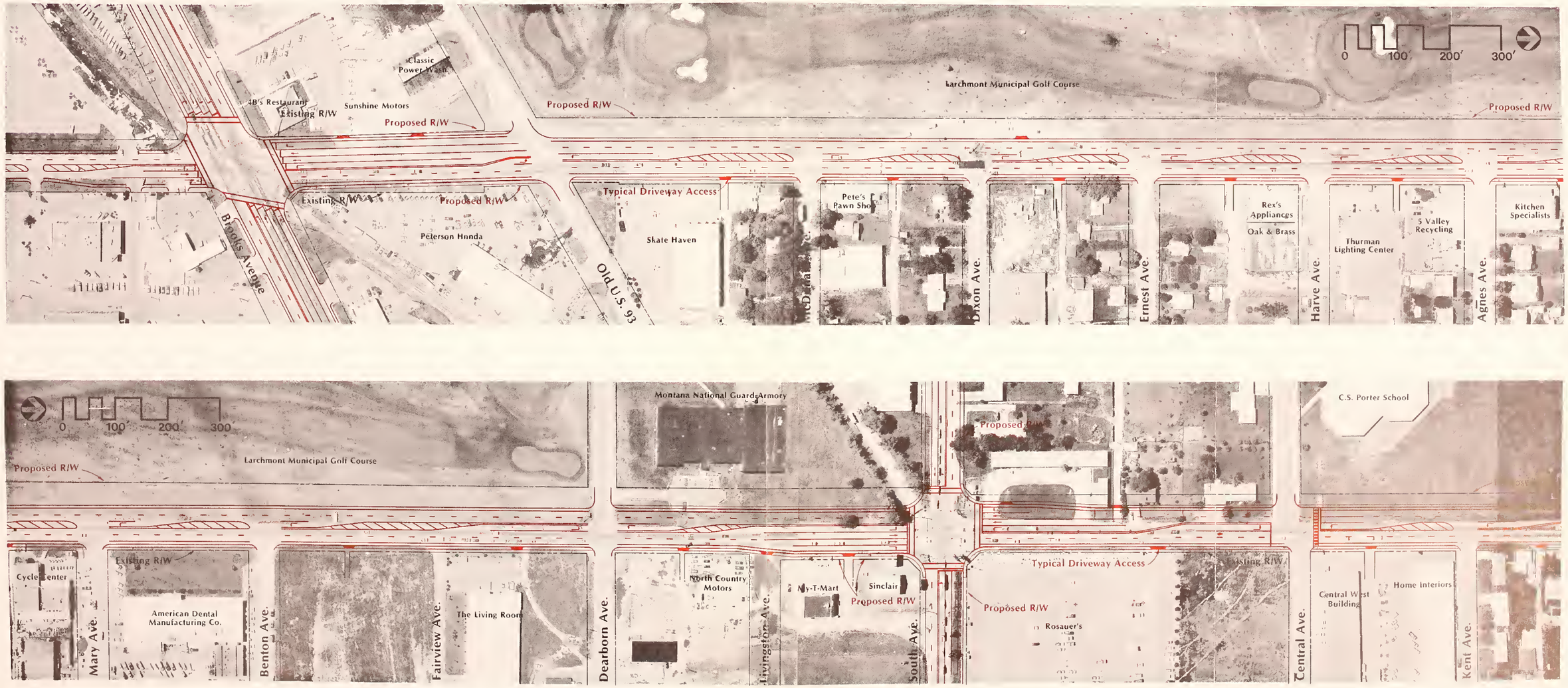
Figure No. 3 shows the preliminary design for the preferred alternative. It should be noted that Figure No. 3 depicts a preliminary design prepared to provide basis of evaluation of potential impacts and is not intended to be the final design for the project. The figure is intended to illustrate many of the design features of the project such as right-of-way limits, access control and traffic channelization.

REFERENCES FOR PART II

1. Keenan Bingham, Supervisor, Urban Planning Section, Montana Department of Highways, in a memorandum to Donald Opitz, Assistant Chief, Planning and Statistics Bureau, MDOH, September, 16, 1982.

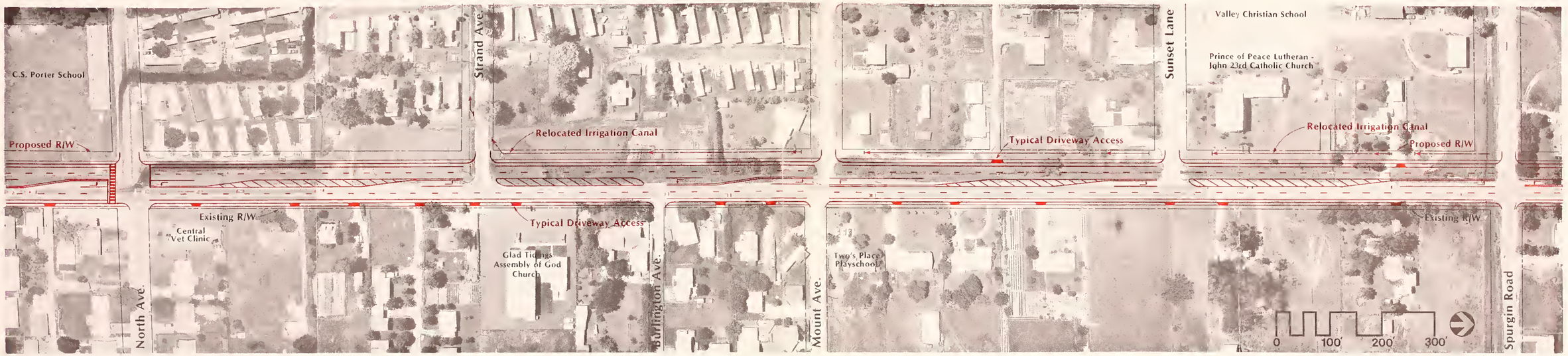
2. Resolution, Montana Department of Highways and State Highway Commission, August, 20, 1981, Designation of Limited Access Highway, Project No. M-8103(3) Right-of-Way, Reserve Street, Missoula, Montana.

PRELIMINARY DESIGN OF PREFERRED ALTERNATIVE



NOTE: This Figure shows a preliminary design that was prepared for the E.I.S. The purpose of the preliminary design is only to provide a basis of evaluation for potential impacts, and is not intended to be the final design for the project.

FIGURE 3A



NOTE: This Figure shows a preliminary design that was prepared for the E.I.S. The purpose of the preliminary design is only to provide a basis of evaluation for potential impacts, and is not intended to be the final design for the project.

FIGURE 3B

PART III: AFFECTED ENVIRONMENT

PART III: AFFECTED ENVIRONMENT

A. INTRODUCTION

The environmental impacts associated with the roadway alternatives can be accurately assessed only after the current environmental conditions of the study area have been identified. The existing environmental conditions were generally categorized for purposes of analysis into the physical, biological and human environment. Cultural, recreational and visual resources were also considered, as were other areas or issues that were determined to be environmentally sensitive. Within each category, those features judged to be significant and/or required by regulations were addressed. This evaluation process required reviews of current literature and documented studies, and utilization of information received at public meetings conducted for local residents.

B. PHYSICAL ENVIRONMENT

1. CLIMATE

The study area is located in a broad river basin in the central portion of Missoula County, Montana, with topography ranging from 3,200 feet on the floor of the Missoula Basin to over 7,000 feet on nearby peaks. Missoula's location between the Bitterroot Range and the Continental Divide results in a climate with both maritime and continental features. In addition, local variations in climate may be produced by the Clark Fork and Bitterroot Rivers and numerous creeks throughout the Missoula Valley.

The climate of the Missoula Valley may be described as a modified maritime type, and is typical of that found in other intermountain valleys of the Pacific Slope. Although the Pacific maritime climate dominates most often, continental air masses may invade the area and influence weather conditions during all seasons. Annual precipitation in Missoula averages between 12 and 13 inches. Average snowfall at Missoula is approximately 45 inches. Precipitation in the Missoula Valley varies widely with the season; however, May and June are the months of highest precipitation. Slightly more than half of the annual precipitation in Missoula occurs between May and September.

Winter temperatures in the study area average more than 20 degrees, although several times each winter temperatures may drop as low as -35 degrees. Spring and early summer are often cool and cloudy with frequent rains over the valley. Summer and early fall in Missoula are characterized by clear skies and warm temperatures (mid 60's) with occasional thunderstorms. During July and August, generally the warmest period of the year, temperatures occasionally rise to more than 100 degrees. During the fall months, it is not uncommon for the study area to encounter extended periods of cloudy, damp and foggy weather. The Missoula Valley generally experiences about 125 frost-free days each year.

2. GEOLOGY & SOILS

a. Geology

The geologic history of the Missoula Valley began over 600 million years ago during the Precambrian Age. During that time, sediments were de-

posited and further modified through the ages by heat and pressure to form the igneous and metamorphic base rocks which underlie the valley and appear in adjacent highlands.[1] A great mass of sediments which may be more than 500 feet thick in some places overlays the base rocks. This sedimentary material is from the Tertiary Age and consists primarily of erosional debris and occasional traces of volcanic ash. The Quaternary Age is characterized by a period of alpine glaciation which modified the existing rock strata and began to form the present topography. This glacial activity produced large quantities of debris that were ultimately deposited in the Missoula Valley. Although much of this glacial debris was transported out of the Missoula Valley, approximately 140 feet of clay, silt, sand and gravel remained.[1] An additional 115 feet of sediments were ultimately deposited in the Missoula Valley as a result of Lake Missoula, an ancient lake formed by glacial damming of the Clark Fork River.[1] The materials underlying the study area are erosional and depositional in nature, and were originally deposited in the Clark Fork floodplain. The present topography of the study area reflects the depositional origin of much of the base material in the Missoula Valley.

Descriptions of the geologic formations likely to be directly encountered as a result of roadway construction or rehabilitation are described below.[1]

1) RECENT ALLUVIUM

This material consists of poorly sorted, unconsolidated silt, sand and gravel on the floodplains of the Clark Fork and Bitterroot Rivers. The parent material of the Clark Fork floodplain alluvium consists of a wide variety of igneous, metamorphic and sedimentary rocks formed from various sources in and outside the Missoula Valley. This material is often indistinguishable from underlying sediments. Areas north of the South Seventh and Reserve Street intersection are generally underlain by this material.

2) OLDER ALLUVIUM

This material consists of a thin layer of reworked silt from glacial Lake Missoula and poorly sorted, unconsolidated gravel. This material is commonly found on low terraces adjacent to the floodplains of the Clark Fork and Bitterroot Rivers. Glacial activities are responsible for the origin of much of this material. This older alluvium may be found under soils in the area generally south of the South Seventh Street and Reserve Street intersection.

b. Minerals

Non-metallic minerals such as sand, gravel and barite are known to exist in this portion of the Missoula Valley; however, no known mining of these minerals is presently underway within the study area.

c. Faults

No faults are known to exist within the study area. Two known faults, the Clark Fork and Hourglass Faults which run through the central portion of the Missoula Valley, are located approximately five miles north and west of this project.

d. Earthquake Hazard

The seismic risk map developed in 1969 classified the study area as a Zone 2 risk area (moderate earthquake damage is expected).[2] Some Missoula area structures sustained slight damage as a result of a major earthquake (magnitude of 6.9 or greater) which occurred on October 28, 1983 near Challis, Idaho.

e. Landforms/Soils

Soils within the study area are associated with depositional landforms resulting from fluvial or glacial processes. These depositional landforms, consisting primarily of silt, sand and gravel parent materials, were modified over time by climate, topography and organisms to form the present soils found in the study area. Geologic parent materials determine many of the physical and chemical properties of soils which in turn facilitate predictions of soil properties, potentials and limitations.

The soils in the immediate project area have been altered through urban development to the extent that recognition of the soil and its properties is impractical. Two soils, the Grantsdale Series and the Moiese Series, have been identified and tapped in the proximity of the Reserve Street area.[3] A discussion of each series is included in the following narrative.

1) GRANTSDALE SERIES

These soils are generally found on terraces in intermountain valleys and are formed from alluvial materials. The surface soils are typically loam with a moderately fine granular structure. Subsoils are very gravelly loamy sand with a mixture of pebbles and cobbles. The soil is deep, well drained and may present slight limitations for road building. This soil is found in areas with slopes ranging from 0 to 2 percent.

2) MOISE SERIES

These soils are found on terraces and fans and are formed in sandy and gravelly alluvium. The surface soils are gravelly loam with a fine structure and a notable fraction of pebbles. Subsurface soils are notably coarser and range from very gravelly sandy loam to gravelly sand. This excessively drained soil may present slight limitations to road building. The soil occurs on slopes ranging from 0 to 2 percent.

f. Prime and Unique Agricultural Lands

Consultations with the U.S. Department of Agriculture, Soil Conservation Service in Missoula indicated that no prime or unique agricultural lands exist within the study area.[3]

3. WATER RESOURCES & QUALITY

Water resources within and adjacent to the Reserve Street corridor include both surface water and groundwater regimes. Surface waters within the actual corridor are confined to three branches of the Missoula Irrigation District canal system, while the entire area is underlain by groundwater at moderate depth. Northwest of the area lies the confluence of two major rivers, the Clark Fork and the Bitterroot, which flow north and west of the area, respectively. Studies of the area's water resources have been performed and documented in the past two decades by various governmental agencies and academic institutions, including the Montana Department of Health and Environmental Sciences (MDHES), Montana Bureau of Mines and Geology, Montana University Joint Water Resources Research Center, City of Missoula, and Missoula County. The results of these investigations have been used in the compilation of the following comments.

a. Surface Waters

The surface water resources in the vicinity of Reserve Street are shown in Figure 4. The entire area lies within the Clark Fork River drainage; the Bitterroot River is considered a tributary thereto. The waters addressed in this section are those that, by virtue of their proximity to Reserve Street, may be impacted by the proposed project. Other outlying surface waters can be excluded from consideration because of their remoteness from the study corridor.

1) MISSOULA IRRIGATION DISTRICT CANALS

Three grass- or concrete-lined irrigation canals cross the Reserve Street corridor, and are part of a larger system owned by the Missoula Irrigation District. The canals all feed water to the west from a diversion point approximately two miles upstream on the Clark Fork River. The canals are used seasonally in conjunction with hay and miscellaneous produce agriculture interspersed along and to the west of Reserve Street. Use of the canals is confined to the usual irrigation season, i.e. June through September annually. Photographs 5 and 6 contained in Part I of this EIS depict the irrigation canal which parallels a portion of Reserve Street.

In conjunction with the canals, several head-gate and flow distribution structures are in place along Reserve Street to adjust flows in the canals. Some limited private diversion ditches from the canals also exist along the corridor, and are used by private landowners for localized irrigation.

2) BITTERROOT RIVER

The Bitterroot River occupies the broad and scenic lower Bitterroot Valley prior to passing approximately three miles west of Reserve Street and joining the Clark Fork River. The Bitterroot River is a free-flowing river designated B-1 by the Montana Department of Health and Environmental Sciences. (A definition of the B-1 classification is contained in the Glossary.) Average flow in the Bitterroot at its confluence with the Clark Fork River is approximately 1,500 cfs.[4]

The quality of the Bitterroot River is documented by MDHES data.[5] Suspended solids and sediment in the river are generally low except during major runoff events. The water temperature is consistently low and the dissolved oxygen concentration remains high, supporting a substantial trout fishery. Trace concentrations of heavy metals are low. Chlorides, organic salts, coliform organisms, nitrates and ammonia are all low, indicating the absence of appreciable sewage and agricultural runoff contamination. Development in the Bitterroot Valley and Missoula's South Hills area is responsible for an increase in the quantities and

FIGURE 4

SURFACE WATER RESOURCES

contamination potential of storm water runoff as well as the severity of flood damage in recent years.[6]

3) CLARK FORK RIVER

The Clark Fork River is also classified as a B-1 quality stream by the MDHES (see Glossary for definition of B-1 classification). Average flow in the river above its confluence with the Bitterroot River just northwest of the Reserve Street corridor is approximately 3,000 cfs.[4]

The quality of the Clark Fork River as it flows approximately one mile north of the Reserve Street corridor, while designated similarly to that of the Bitterroot River is somewhat inferior. As reflected by MDHES data, concentrations of trace metals and organics are slightly higher, as are chlorides, organic salts, coliforms and nitrogen forms. The water temperature remains low and dissolved oxygen concentrations are adequate to support a good trout fishery. However, diurnal oxygen depletions below tolerance levels for salmonid fishes were documented in 1977 in localized areas, and are attributed to algal respiration.[7] One of the areas identified was just downstream of the Missoula municipal wastewater treatment plant which discharges to the river just north of the Reserve Street corridor. Silt and sediment are low in the river except during high runoff events.

In addition to the discharge from the municipal wastewater treatment plant, the Clark Fork River is subject to mining and ore processing discharges near its headwaters in the Butte and Anaconda areas, and wood product processing contributions in the Milltown and Missoula areas.

b. Groundwater

The Reserve Street corridor is underlain by alluvial groundwater at moderate depths. Sands and gravel deposited as alluvium of the Clark Fork and Bitterroot Rivers and tributary streams underlie much of the valley floor in the area and contain groundwater in appreciable quantities. Interbedded lenses of silt influence groundwater distribution and circulation in localized groundwater areas.[8]

An inventory of groundwater observation wells in the corridor reveals a slight inclination of the water table upwards to the southeast. Typical groundwater depths along the corridor range from 29 to 34 feet below the ground surface, with lesser depths predominating northwest of the corridor and greater depths typical to the southeast.[9] This variation is largely a function of the local topography, and absolute water table elevations are much closer to uniform but still exhibit a slight inclination.

Numerous private wells exist along and near Reserve Street, with typical depths ranging from 50 to 75 feet and yields reported as high as 70 gpm. The municipal water supply for Missoula is also predominantly of well origin, with 33 wells in and around the metropolitan area operated by Mountain Water Company, a private water utility. Quite high transmissivities have been reported for the Missoula valley alluvium, ranging from 20,000 to 100,000 square feet per day.[10]

Area groundwater is typically of low to moderate total hardness, low total dissolved solids, and sporadic incidences of moderate to high iron content and natural fluoridation.[9] Some natural background nitrate concentrations have also been observed.[7] The low hardness and otherwise similar quality suggests appreciable recharge from the adjacent rivers as would be expected in this alluvial aquifer situation. The Mountain Water Company routinely samples and tests their wells under requirements for public water supply, and violation of EPA Primary and Secondary Drinking Water Standards or evidence of groundwater contamination have not been observed for any of their wells.[11] Localized groundwater contamination has been documented in outlying areas attributable to septic tank drainfields, but substandard construction practices in violation of City/County Health Department regulations were typically involved.[7]

c. Sanitary Sewers, Water Mains, and Storm Drainage

Existing underground pipe utilities for the transport of water or wastewater along Reserve Street include Missoula City sewer mains, Mountain Water Company water mains, and Montana Department of Highways storm drains.

A major sanitary sewage interceptor line runs the length of Reserve Street and carries flow north to the Missoula wastewater treatment plant. Five additional lateral sewers cross Reserve Street in the study area and tie to this interceptor. The line is currently composed of 18-inch diameter transite pipe south of the Dixon Avenue intersection and 21-inch diameter transite pipe north of Dixon. At Dixon Avenue, a sewage lift station pumps the sewage into the 21-inch main. This lift station was moved and reconstructed in 1983 to permit widening of Reserve Street, and at the same time its flow capacity was expanded. Photograph 2 contained in Part I depicts the new lift station and its relationship to the existing roadway. It is predicted that by 1990 the existing Reserve Street interceptor will be at capacity, and with continuing development of the South Hills area which it serves, additional capacity will be required.[12] A parallel 15-inch relief sewer along Reserve Street is proposed to alleviate this situation, and the

existing 18- and 21-inch lines would remain in service. The new lift station already includes sufficient capacity to serve the additional relief sewer, and the City has tentative plans to schedule construction of the relief sewer just ahead of the Reserve Street expansion or at least install casings for lateral sewer crossings during the road construction.[11]

Four Mountain Water Company water mains cross Reserve Street in the study area, linking the bulk of the municipal distribution system lying east of Reserve Street to outlying service areas west of the street. Two isolated blocks of water mains in parallel alignment to the street also exist.

Storm drainage facilities along the corridor are confined to a one-block stretch of drain pipe serving inlets at the intersection of Old Highway 93 and Reserve Street, and delivering flow back to the intersection with new Highway 93. At that point, drainage enters a Department of Highways piped drainage system serving the new Highway 93 corridor. Flow from this system enters the Bitterroot River just north of the Highway 93 bridge without treatment or detention. This system was oversized to handle a portion (perhaps 30%) of the drainage from the study area corridor, once a piped drainage system is installed.[12] With the exception of a few isolated inlets with seepage pits, the remainder of the study corridor along existing Reserve Street is without formal drainage facilities. A combination of overland flow and percolation drains water from the existing road surface and right-of-way areas. The three irrigation canals crossing the corridor undoubtedly receive and remove some of this runoff in their localized areas. The parallel run of irrigation canal for six blocks south of Spurgin Road probably accumulates the greatest amount of runoff due to its alignment.

Beginning at the north end of the study corridor, a piped storm drain system installed by the Department of Highways serves the remainder of Reserve Street north of Third Street. This system delivers flow north to the Old Milwaukee Railroad crossing, where it combines with flow coming from north of the crossing. An outfall pipe then parallels the tracks to the west and discharges to a ditch leading to the Clark Fork River. The 800-foot ditch adjacent to the railroad roadbed provides rudimentary detention for the stormwater collected in this system. This storm drain system was designed to include extra capacity to handle a portion of the runoff from the study corridor once Reserve Street is widened and a piped drainage system is installed.[13]

4. AIR QUALITY

The Missoula Valley consists of portions of the Clark Fork Valley extending from Missoula twenty miles to the west-northwest, and the Bitterroot Valley. The Missoula Valley floor forms a deep pocket with the surrounding mountains: the Bitterroot Range to the west and southwest, the Sapphire Mountains to the southeast, and Reservation Divide to the north.

The dominant factors influencing the air pollution dispersion potential of an area are wind speed and direction. Other important factors affecting dispersion potential are atmospheric stability, barometric pressure, humidity, the mixing depth of the wind, precipitation, temperature, and topography.

Under certain stable meteorological conditions, the dispersion of pollutants from the Missoula Valley is very limited. When air is extremely stable, an inversion is said to occur. Pollution released into an inversion layer will be trapped and concentrated within that layer. If such an inversion layer occurs at the surface, dispersion will be greatly restricted and high pollutant levels will occur near source areas. An inversion layer located along the surface will act an a lid trapping and concentrating pollutants in the layer below. Inversions frequently occur in the Missoula Valley during the fall and winter months.

In order to determine the relationship between air pollution and meteorology so that ambient air pollution concentrations may be described, anticipated or predicted, both air quality data and meteorological data have been monitored at various sites in Missoula and Missoula County since late 1977.

The Missoula County Health Department operates four total suspended particulate (TSP) monitoring sites in the Missoula metropolitan area: northside, courthouse roof, Rose Park and Boyd Park. The locations of each of these sites are shown in Figure 5. Carbon monoxide (CO) is monitored at Boyd Park. Carbon Monoxide was monitored through July of 1983 by the Missoula City County Health Department at the six-way intersection at Russell Street, Brooks Street and South Avenue. Because of the expense and manpower required to maintain an air quality monitoring site for a time period of sufficient duration to generate useful data, no air quality measurements have been made along Reserve Street.

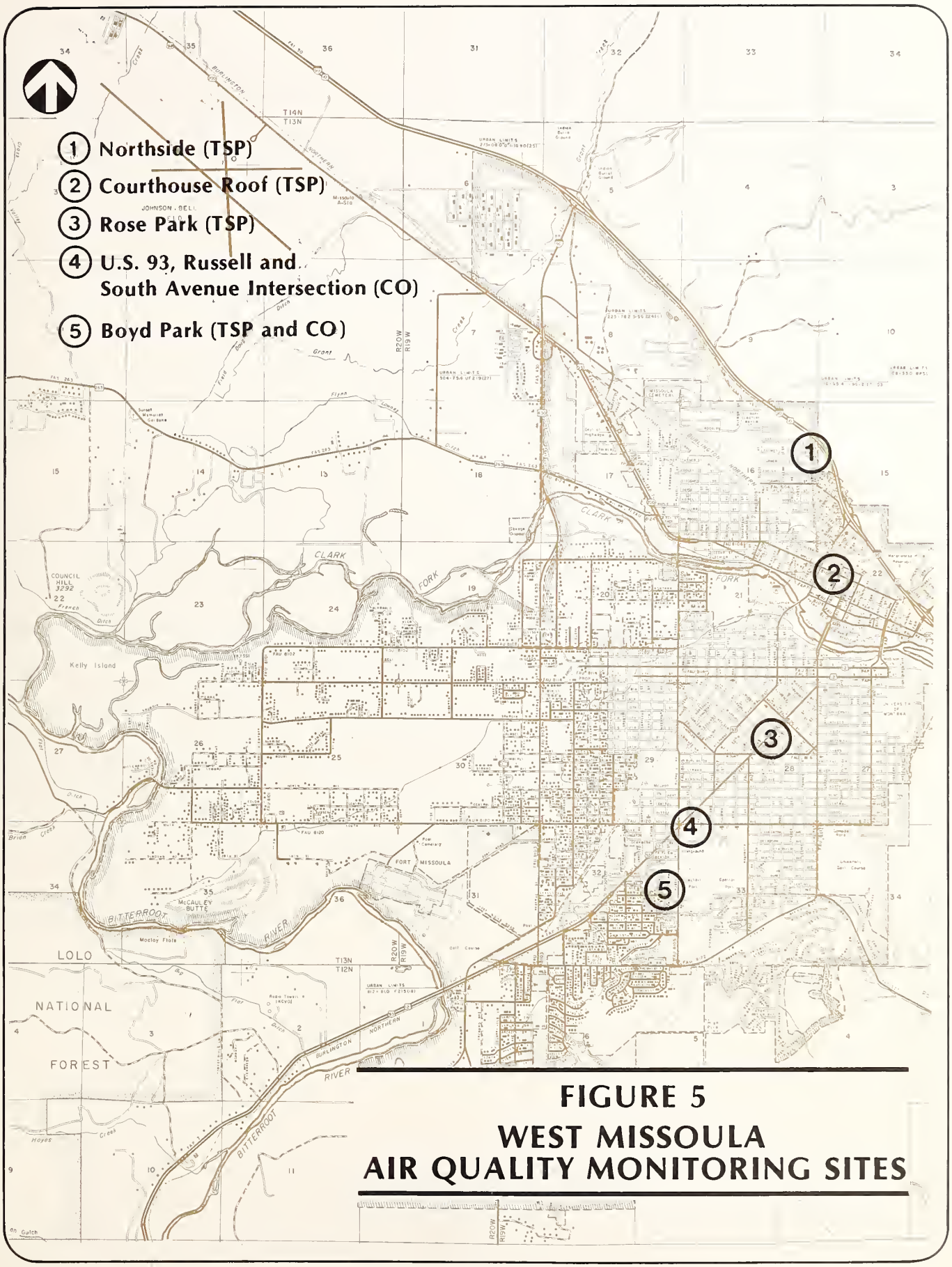


FIGURE 5
WEST MISSOULA AIR QUALITY MONITORING SITES

a. Ambient Air Quality

Monitoring conducted by the Missoula City County Health Department and the Montana State Air Quality Bureau has resulted in the designation of Missoula as a non-attainment area for both total suspended particulates and carbon monoxide. This designation means that pollutant levels exceed standards established by the Federal Government.

Standards for the evaluation of air pollution levels have been adopted by both the Federal Government and the State Government. Federal standards are divided into primary standards which, when exceeded, have adverse effects on human health and secondary standards which, when exceeded, can cause health and property damage. State and federal standards for total suspended particulates and carbon monoxide and the highest monitored values for TSP and CO during 1981 and 1982 are shown for each of the monitored sites on Table No. 2.

Designation of Missoula as a non-attainment area for total suspended particulates is based on an annual mean of 77.4 micrograms per cubic meter (ug/m^3) and six days above the 24-hour standard in 1982. Designation as a non-attainment area for carbon monoxide is based on the 9 ppm 8-hour average being exceeded 55 times in less than one year, with a maximum 8-hour average of 13.87 ppm. Proposed boundaries for the non-attainment area for TSP include all areas exceeding the primary standard; this area is also proposed for designation as non-attainment for the secondary standard. The designated CO area is the same as the area currently designated non-attainment for the TSP primary standard; these boundaries include those areas of major arterials where current traffic volumes cause violations. The non-attainment boundaries for CO and TSP currently are the city limits of Missoula.

Data from the Missoula particulate monitoring network indicates a downward trend for TSP. Particulate levels at the courthouse roof and Rose Park sites decreased 11 and 7 percent, respectively, from 1981 to 1982.[14]

Missoula is designated as either an attainment area or unclassified with respect to nitrogen oxides (NO_x), sulfur dioxide (SO_2), and oxidants (ozone).[15]

b. Emission Sources

The major sources of total suspended particulates in the immediate Missoula area are re-entrained dust from along paved roads during snow-free periods, and particulates generated in the winter months by residential wood burning. Other significant sources of TSP in the Missoula

TABLE 2

MAXIMUM OBSERVED PARTICULATE & CARBON MONOXIDE CONCENTRATION IN MISSOULA, MONTANA AND THE CORRESPONDING STATE & NATIONAL AIR QUALITY STANDARDS

	Total Suspended Particulates (ug/m^3)		Carbon Monoxide (ppm)	
	Annual*	24-Hr.	8-Hr.	1-Hr.
Federal & State Standards				
Montana Standard	75	200	9	23
Federal Primary	75	260	9	35
Federal Secondary	60	150	9	--
Missoula Monitoring Sites				
Courthouse:				
1981	62	220	--	--
1982	55	256	--	--
Boyd Park:**				
1981	81	195	8.5	14.3
1982	72	319	9.2	13.4
Northside:				
1982	58	138	--	--
Rose Park:				
1981	56	208	--	--
1982	52	381	--	--
Six-Way Intersection:				
1981	--	--	11.7	12.3
1982	--	--	15.0	19.9

* Geometric mean is used for all annual concentrations and standards for TSP with the exception of the Montana Annual Standard, which is an arithmetic average. All short-term standards are not to be exceeded more than once a year.

** Less than eight months of data.

Source: Montana Air Quality Data and Information Summary for 1982 (Montana Air Quality Bureau, 1983)

area are fugitive dust generated along unpaved roads and point sources; point sources include all of the major manufacturing plants in the Missoula Valley.[16]

Carbon monoxide is the by-product of the incomplete combustion of organic fuels. The major sources of carbon monoxide in the Missoula Valley are automobiles and residential wood burning.

High concentrations of carbon monoxide observed at the six-way intersection monitoring station during 1982 were due to high exhaust generation rates resulting from poor traffic flow characteristics at this location. High concentrations of carbon monoxide observed at the Boyd Park monitoring station during 1982 are believed to be primarily due to residential wood burning.[14]

c. Dispersion Meteorology

The Montana Air Pollution Study (MAPS) defined and studied from May 1978 through November 1979 the primary meteorological parameters that affect air pollution levels in the Missoula Valley. The following narrative will discuss general meteorological conditions in the Reserve Street project area since the nearest source of complete meteorological data is located at Johnson-Bell Field more than three miles from the project site and local weather conditions vary throughout the valley.

The topography of the Missoula Valley creates a low level wind pattern which varies significantly from one portion of the valley to another, and from day to night. The diurnal wind pattern of the Missoula Valley results when, during the day, an increase in the temperature at the surface of the earth causes air currents to rise out of the valley. During the night, a decrease in the temperature at the surface of the earth causes cooler air to flow into the valley. The cool, dense air flowing down the mountains often remains close to the surface and holds the air pollution in the valley area; when this situation occurs, and the temperature of the atmosphere rises with increased elevation, an inversion is said to occur.

Major temperature inversions result in severe air pollution conditions in the fall and winter. The Missoula Valley almost always experiences poor ventilation during November and December. The ability of the Missoula Valley airshed to disperse pollutants is limited to a relatively slow constant rate, with some improvement during the middle of the day.

The Montana State Air Quality Bureau speculates that during the morning and early afternoon of periods of poor ventilation, the CO emissions

generated by automobiles and residential wood burning are almost equal to the dispersion rate, with the exception of the 8:00 a.m. traffic peak. After about 3:00 p.m. the CO emissions rate exceeds the dispersion rate and an increase in CO concentrations results. After midnight when emission rates decline, the dispersion rate again exceeds the emission rates and CO concentrations begin to decline.[14] During periods of good ventilation, air pollutants tend to disperse and ground level concentrations do not accumulate.

5. NOISE

Noise measurements were made at 40 locations along the study corridor. Nineteen measurements were taken on October 18 and 19, 1983 with additional measurements taken on February 28 and 29, 1984. Noise levels were recorded for a 15-minute interval at various distances from the roadway and at various times during the day. Noise measurements were taken near residences, schools, churches, playgrounds and other sensitive land uses. Figure No. 6 shows the location of the recording sites. The results of the measurements were determined according to the category L_{10} (defined as that level of sound exceeded ten percent of the time). Sound levels along the study corridor were primarily affected by the traffic on Reserve Street although traffic on adjacent roadways and sound generated by other forms of human activity did contribute to the background noise level.

Measurement of the sound levels was made by recording noise at each location using a microphone/tape recorder and sound level meter. Recorded noise for each site was then analyzed with a noise level recorder and a statistical distribution analyzer.

The most generally used measure of the magnitude of traffic noise is in units of dBA (the sound pressure levels in decibels measured with a frequency weighing network corresponding to the A-scale on the standard sound level meter.) The acute threshold of hearing is 0 dBA, and the threshold of pain is 140 dBA. The ear generally perceives a sound level change of 3 dBA as barely noticeable, 6 dBA as a significant increase, 10 dBA as twice as loud, and 20 dBA as very much louder.[17]

The FHWA design noise levels for specific receptors and land use types are identified in Table No. 3.

(7) Exterior Noise Monitoring Locations

(8) Interior Noise Monitoring Locations

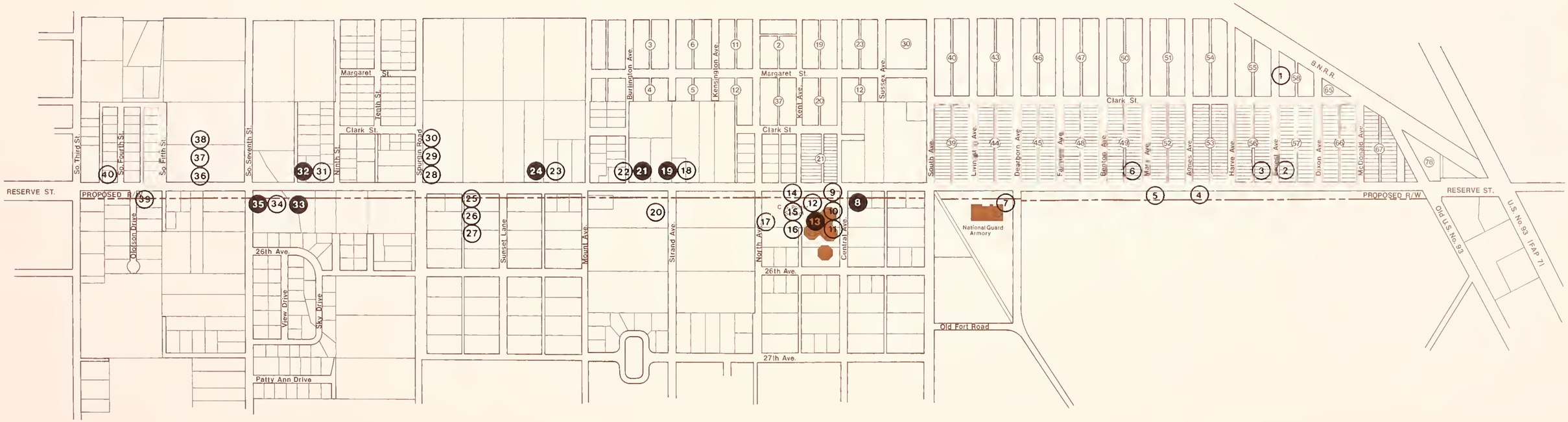


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FIGURE 6

NOISE MONITORING LOCATIONS

TABLE NO. 3

NOISE ABATEMENT CRITERIA[18]

Design Noise Level (L10)	Description of Land Use Category
60 dBA (Exterior)	A) Tracts of land in which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose
70 dBA (Exterior)	B) Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, picnic areas, recreation areas, playgrounds, active sports areas, and parks
75 dBA (Exterior)	C) Developed land properties or activities not included in Categories A and B above; i.e., commercial and industrial development
55 dBA (Interior)	D) Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals and auditoriums

The three major components of highway noise are engine noise, exhaust noise, and tire noise. These are dependent on speed, acceleration, grade, and roadway condition. Engine and exhaust noise are the primary source of noise for vehicles at slower speeds, and tire/roadway interaction for vehicles at higher speeds. Large diesel trucks produce the loudest traffic noise. Traffic mix, i.e. the number of automobiles, medium trucks and heavy trucks, is important when measuring and predicting L_{10} noise levels, since each type of vehicle generates a different level of sound.[17]

For the noise study done for this project, both the traffic volume and the traffic composition were measured during the recorded period at each test site.

Predictions of the present noise levels were made using the computerized FHWA Highway Traffic Noise Prediction Model SNAP 1.0 (Simplified Noise Analysis Program). The model utilizes the existing conditions (i.e., distance from observer to source, traffic volume and composition, average vehicle speed, etc.) to compute a predicted noise level.[19] Table No. 4 shows the actual recorded noise levels and the SNAP 1.0 prediction of L_{10} noise levels based on existing traffic conditions.

TABLE NO. 4

PRESENT NOISE LEVELS

Site No.	Time and Date	Distance from Centerline	Actual Hourly Traffic Volume	Measured L_{10} dBA Noise Level	SNAP 1.0 Prediction of Present L_{10} dBA Noise Level
1	11:58 am 10/18/83		884	61*	-
2	11:32 am 10/18/83	51'	772	71	67
3	9:24 am 2/29/84	51'	524	69	66
4	9:34 am 10/19/83	99'	596	69	65
5	3:05 pm 2/28/84	99'	1028	67	66
6	8:58 am 2/29/84	60'	588	69	64
7	2:29 pm 10/18/83	145'	1024	64	66
8	3:40 pm 2/28/84	67'	1156	51(inside)	-
9	10:01 am 10/19/83	50'	696	73	71
10	10:19 am 10/19/83	100'	844	67	68
11	10:40 am 10/19/83	200'	908	73*	-
12	1:57 pm 10/18/83	192'	872	62	63
13	1:29 pm 10/18/83	195'	900	53(inside)	-
14	10:50 am 2/28/84	50'	628	70	66
15	11:10 am 2/28/84	100'	800	63	67
16	11:30 am 2/28/84	200'	760	62	63
17	12:53 pm 10/18/83	147'	1020	64	67
18	11:55 am 2/28/84	71'	824	68	66
19	12:15 am 2/28/84	76'	868	50(inside)	-
20	11:04 am 10/19/83	160'	928	63	63
21	4:21 pm 2/28/84	85'	1020	55(inside)	-
22	4:01 pm 2/28/84	81'	1044	68	66
23	12:45 pm 2/28/84	72'	872	69	68
24	1:08 pm 2/28/84	78'	884	50(inside)	-
25	4:28 pm 10/18/83	50'	1012	69	65
26	4:42 pm 10/18/83	100'	1212	62	63
27	5:03 pm 10/18/83	200'	1356	58	59
28	7:48 am 10/19/83	50'	2024	74	69
29	8:06 am 10/19/83	100'	884	69	66
30	8:26 am 10/19/83	200'	1088	67	66
31	4:45 pm 2/28/84	138'	1096	65	65

* Test interrupted - noise level invalid.

TABLE NO. 4 (cont.)

PRESENT NOISE LEVELS

Site No.	Time and Date	Distance from Centerline	Actual Hourly Traffic Volume	Measured L_{10} dBA Noise Level	SNAP 1.0 Prediction of Present L_{10} dBA Noise Level
32	5:10 pm 2/28/84	142'	1336	50(inside)	-
33	10:10 am 2/28/84	68'	628	60(inside door open)	-
34	6:58 am 2/29/84	80'	608	68	64
35	7:20 am 2/29/84	83'	1108	55(inside door open)	-
36	7:50 am 2/29/84	50'	964	72	67
37	8:13 am 2/29/84	100'	888	69	65
38	8:31 am 2/29/84	200'	704	60	59
39	11:28 am 10/19/83	60'	844	69	68
40	3:52 pm 10/18/83	59'	1104	70	68

It should be noted in the interpretation of the data presented in Table 4 that the complete model tends to slightly underestimate the noise level for those sites that are 50-55 feet from the source. It should also be noted that at eight sites noise levels were recorded within residential buildings. In all but two cases, all of the windows and doors were closed during the tests thereby reflecting the noise insulation provided by the building. In the cases when inside tests were taken, no computerized predictions were made due to the fact that the computer model is not equipped to assess the sound insulating potential of the various types of structures.

The procedure used for this analysis was to take actual noise measurements in the field and compare them to predicted noise levels to determine if the prediction model was accurate. Future noise levels could then be estimated using the prediction model. Comparisons of measured levels and predicted levels, as shown in Table No. 4, indicate the correlation between the two procedures. A 3 to 4 dBA difference in traffic noise would not be significant.

All other values compare closely and thus the data indicates that the FHWA prediction model is accurate for this study.

6. FLOOD PLAINS

Based on maps of flood hazard areas for the City of Missoula and Missoula County prepared by the Federal Emergency Management Agency (FEMA), it was determined that the project study area does not lie in the 100-year floodplains of either the Clark Fork or Bitterroot Rivers.[20] These maps, which were prepared for communities participating in the National Flood Insurance Program, designate the study area as "Zone C", which denotes areas of minimal flooding.[21] This designation also indicates that the study area lies above the designated floodplains. As participants in the program, both Missoula County and the City of Missoula have adopted floodplain management regulations in the interest of public safety.[20]

C. BIOLOGICAL ENVIRONMENT

1. VEGETATION

Vegetation within the Reserve Street study area is typical of other urban areas of western Montana. Grasses present within the area are dominated by those introduced species normally associated with lawns, golf courses, and roadsides, including Kentucky bluegrass (Poa pratensis); Smooth brome (Bromus inermis); Cheatgrass (Bromus tectorum); and orchard grass (Dacrylic glomerata). Shrubs and forbs common to the study area are a mixture of native and introduced species including: lilac (Syringa vulgaris); Chokecherry (Prunus virginianis); rose (Rosa sp.); juniper (Juniperus sp.); forsythia (Forsythia sp.); spotted knapweed (Centaurea maculosa); yellow sweet clover (Melilotus officinale); goldenrod (Solidago sp.); and tansy (Tanisetum sp.). Overstory species are also represented by native and introduced species including spruce (Picea sp.); Douglas fir (Pseudotsuga menziesia); maple (Acer sp.): birch (Betula sp.); willow (Salix sp.); apple (Pyrus sp.) and cottonwood (Populus Trichocarpa). Gardens in the Reserve Street area are typically used for cultivation of fruits, vegetables and flowers. No listed or proposed endangered or threatened species of plants exist within the area.

2. FISH AND WILDLIFE

Wildlife resources in the Reserve Street area are typical of urban areas within western portions of the state. Habitat for mammalian species is limited and consequently species diversity is fairly low. Representative mammal species for this area may include Nuttall's cottontail (Sylvilagus nuttallii), red squirrel (Tamiasciurus hudsonicus), deer mouse (Pero-

myscus maniculatus), and meadow vole (Microtus pennsylvanicus). Avian species include the American robin (Turdus migratorius), cedar waxwing (Bombycilla cedrorum), starling (Sturnus vulgaris), and ruby-crowned kinglet (Regula calendula). Ring-necked pheasants (Phasianus colchicus) and ruffed grouse (Bonasa umbellus) are infrequent visitors to the overgrown or weedy areas in the vicinity of Reserve Street. These bird species probably represent the only game animals which are seen in the vicinity of Reserve Street.

Fish habitat in the vicinity of the proposed Reserve Street development is limited to irrigation ditches during seasons when ditches are full. An occasional trout or roughfish will find its way into the ditch system at these times. Weed control in irrigation ditches is accomplished by application of herbicides at times when ditches are dry. The combination of spray and seasonal flow severely limits the value of irrigation ditches as a fisheries resource.

Consultations with the U.S. Department of the Interior, Fish and Wildlife Service, indicate that two endangered species, the bald eagle (Haliaeetus leucocephalus) and the peregrine falcon (Falco peregrinus) may be migrant visitors to the project area.(22) Consultations regarding threatened and endangered species, including a Montana Department of Highways, Endangered Species Assessment, are contained in Appendix B.

3. WETLANDS

Based upon field inventories of the biological environment of the study area, it was determined that no wetland areas exist within the limits of the proposed project.

D. HUMAN ENVIRONMENT

1. POPULATION

Missoula County's population grew from 58,263 in 1970 to 76,016 in 1980, an increase of 30 percent for the period. This growth can be attributed to a natural increase in births over deaths of 6,397 and a net migration of 11,356 persons.(23) Eight-four percent of the net migration was among people of working age (20 - 40), reflecting the stronger economy of the 1970's and the presence of the University of Montana, which tends to attract a younger age group. Net migration in the County is expected to continue, but at a slower rate than for the previous decade due to the economic recession. Missoula's urban area is

projected to become the second largest in the state by the end of the 1980's, surpassing the Great Falls urban area, and Missoula County is projected to have 94,000 people by 1990.[24] The amount of projected growth and the increase in numbers of a highly mobile age group have significant implications when planning for a major arterial in the County.

The U.S. Department of Commerce, Bureau of the Census has divided the urban areas of Missoula County into Census Tracts for statistical purposes. Reserve Street bisects Census Tracts 8, 9 and 10 which together had a total population of 10,698 in 1980. In addition to this general population data, the Missoula Planning Office has conducted studies of population and housing for the Reserve Street Planning Area. The location of this planning area, as well as the location of Census Tracts 8, 9 and 10, are shown in Figure 7.

The studies conducted for this plan indicated that 1,053 dwellings existed within the Reserve Street planning area in 1980.[25] This plan utilized the number of dwelling units and an average household size of 3.02 persons to estimate that the 1980 population was 3,180. Data contained in the 1980 Census indicated that the average household size for Census Tracts 8, 9 and 10 was actually lower than the figure used by the Missoula Planning Office. Utilizing this lower household density (2.36 persons per household), the 1980 population of the Reserve Street Planning Area was approximately 2,485.

The population of the Reserve Street area is expected to continue to increase through the year 2000. Population studies conducted for Missoula's 201 City/County Sewer Facilities Plan Report indicate that the population of Census Tracts 8, 9 and 10 would experience an increase in population of 22 percent by the year 2000.[26] The Reserve Street Area Plan contains a breakdown of this growth by five-year intervals. Utilizing these growth rates, the 1983 population is estimated to be approximately 2,527 and the population for the year 2000 is projected to be 3,030. Recent population analyses conducted by the Missoula Planning Office for Missoula County areas, including Census Tracts 8, 9 and 10, supported these projected population trends.[27]

2. HOUSING CHARACTERISTICS

During the decade of the 1970's, total numbers of housing units increased at a more rapid rate than did total population. As indicated in the 1980 Census, there were 30,534 housing units in Missoula County. This total illustrates a 61.6 percent increase in housing compared to only a 30.5 percent increase in County population. The 1980 Census determined that Census Tracts 8, 9 and 10 contained 4,154 housing units.

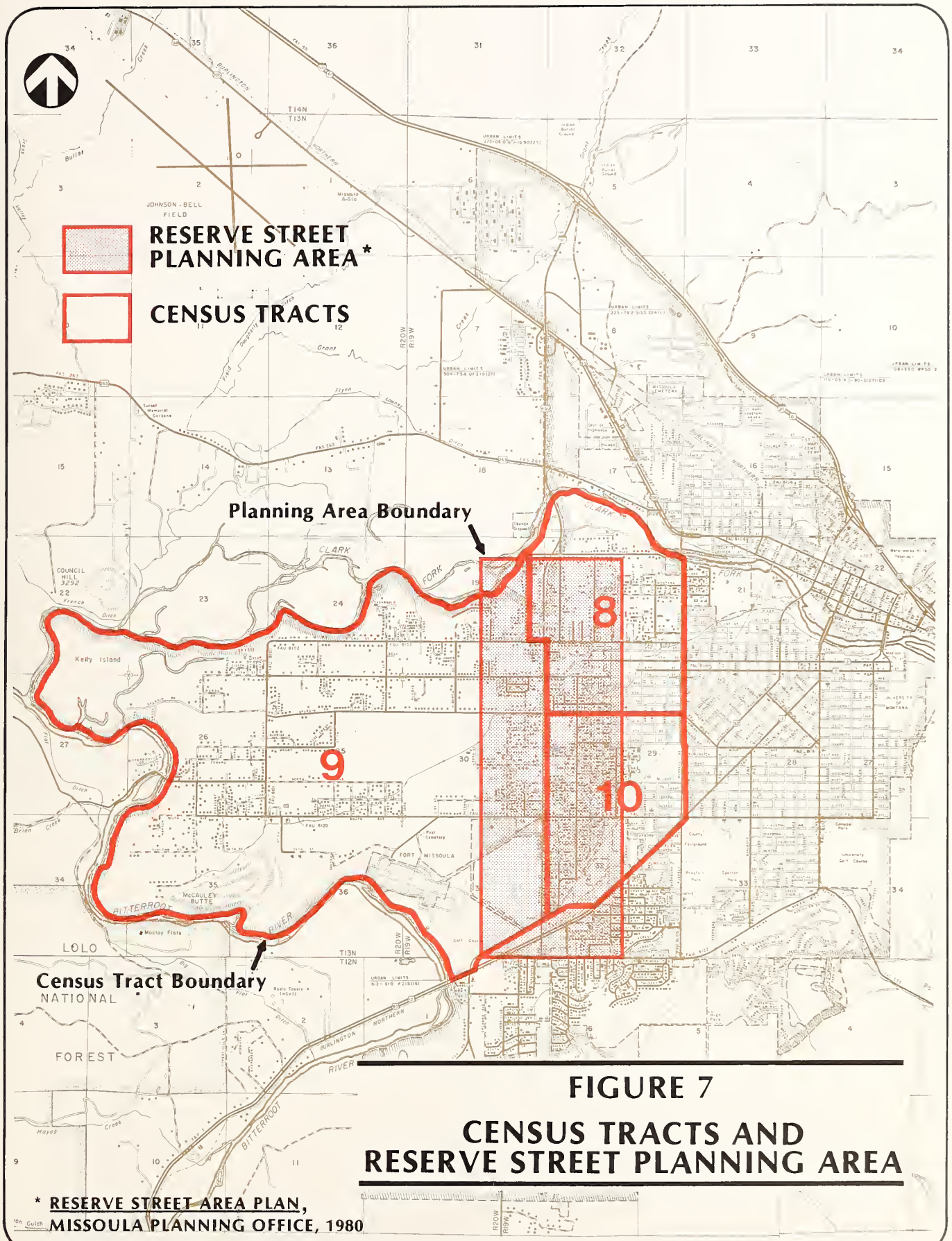


FIGURE 7

CENSUS TRACTS AND RESERVE STREET PLANNING AREA

* RESERVE STREET AREA PLAN, MISSOULA PLANNING OFFICE, 1980

Data collected by the Missoula Planning Office for the Reserve Street Area Plan indicated that 1,053 housing units of this total were located in the Reserve Street Planning Area.[25] Approximately 53 percent of this total were single-family dwellings. Mobile homes and multi-family dwellings comprised 19 and 28 percent of this total, respectively.

Based on population estimates for 1983 and the average housing density of 2.36 persons per household determined by the 1980 Census, it is estimated that approximately 1,071 housing units exist within the Reserve Street Planning Area. It is estimated that an additional 503 persons will reside in this area by the year 2000, requiring an increase of 213 housing units over the period.

In conjunction with the Reserve Street Area Plan, the Missoula Planning Office conducted a vacant land inventory and assessed the development potential of small parcels within the study area. This analysis indicated that approximately 231 acres of vacant land which existed in 1980 would allow for an additional 330 housing units.[25] Single-family lots of areas greater than one-half acre were also inventoried and the redevelopment potential of each parcel was assessed. Results of this analysis indicated that the redevelopment potential of these parcels is 380 units.[25] Therefore, vacant lands within the Reserve Street Planning Area would allow for a total of 710 housing units to be added at existing residential densities. This total indicates that the area could easily accommodate projected population growth and its accompanying residential development. In recent years there has been a trend toward "in-filling" of vacant lands, especially in established residential areas. Currently, no known major subdivisions are projected for the immediate study area.[25]

a. Property Values and Sales

The Missoula County Real Estate Report, May 1982, compiled housing price and sales data from properties listed with the Multiple Listing Service. Figures from this report indicate that in the first quarter of 1982, the average single-family home in Missoula sold for $69,408. There were 305 homes available in the $40 to $80 thousand price range. The average number of days a property stayed on the market was 96.6, the longest average length recorded for the past four years. The highest number of sales occurred for homes priced in the $50 to $70 thousand range.During this same period, only one duplex sold, staying on the market for 44 days. Two multi-family units sold in an average of 385.5 days.[28]

The report divides the Missoula urban area into five sub-areas, two of which are pertinent to this study. Area 1 encompasses Downtown,

North, West, and South Additions east of Reserve and north of Highway of 93. Area 5 encompasses that area west of Reserve Street including the Target Range, Big Flat, Orchard Homes and Grant Creek residential areas. Area 1 (east of Reserve) figures showed that the average price per single-family dwelling in the first quarter of 1982 (the most recent figure) was $46,148. This figure is one- to six-thousand dollars lower than the quarterly figures for three previous years. The number of sales (ten) was the lowest of any of the previous figures, and the average number of days on the market (78.3) was the highest. In Area 5 (west of Reserve), the average price for homes listed was $73,160. The number of sales was low at 9, with 67 total listings. Average days on the market was 61, notably less than the overall urban area average of 96.6 days.

These figures indicate that the housing market is slow in general when compared to the three previous years, due to the recession and high interest rates. (The average interest rate in 1982 was 14.54 percent, while on new homes it was 16.99 percent in the County.) In comparison to overall County figures, homes in the study area are generally in a desirable price range, and days on the market are lower than the average.

In order to determine whether these figures give general trends for the immediate project area, realtors having knowledge of the market directly along Reserve Street were interviewed. Real estate specialists familiar with the existing situation unanimously agreed that the current traffic volumes, noise, pollution, and difficulty with left-turn movements made residential property adjacent to the roadway much harder to sell than property even one block away.(29)

There have been very few sales of property along Reserve over the past few years. One home with one-half acre on Spurgin Road, 200 yards west of Reserve, sold in August, 1983 for $72,000.(30) This price was thought to be comparable to similar houses on the market, indicating that at a distance of 200 yards, Reserve Street is not significantly affecting residential property. Another sale is now being negotiated involving a house with a small commercial enterprise directly along Reserve Street. The buyer clearly has commercial intentions for the property.(30)

Persons interviewed also agreed that the property directly adjacent to Reserve Street is diminishing in its value for residential use, but that the land itself is worth more as commercial property. A land appraiser explained that as commercial development enters a residential neighborhood (as is the trend along the southern project area), surrounding property becomes less desirable for residential use. The residential improvements decrease in value while the land itself increases in value.(31)

Commercial property values along Reserve vary generally from $1 to $7 per square foot. The high end of this range is typified by property on the east side of the road, south of Central Avenue. Owners trying to sell desire commercial values for their property because they view it as a major connection between Highway 93 and Interstate 90.(30)

Appraisers for the Montana Department of Highways formulated estimates of the property values for the project area in an effort to estimate land acquisition costs for additional right-of-way purchases along the roadway. Properties adjacent to the Larchmont Municipal Golf Course were valued at $1.00 per square foot, since the property is under County ownership. The properties adjacent to the existing right-of-way along Reserve Street were valued at between $1.00 and $3.00 per square foot.(32)

3. LAND OWNERSHIP AND LAND USE

a. Land Ownership

The properties within the study area are either privately owned or owned by governmental entities. Properties owned by Missoula County include the Larchmont Municipal Golf Course, C.S. Porter School, and a parcel of vacant land adjacent to Rosauer's. State-owned properties adjacent to this section of Reserve Street include the National Guard Armory and two parcels of right-of-way already acquired by the Montana Department of Highways. The remainder of the land along the roadway is privately owned. Residents and owners of properties adjacent to the west side of Reserve Street would be directly affected by the acquisition of additional right-of-way required by the construction alternatives.

b. Land Use

The Missoula Planning Office conducted a field inventory of land use in the area adjacent to Reserve Street during 1979 and 1980. This detailed information was compiled in the Reserve Street Area Plan, and summarized types of land uses and improvements for each parcel within the planning area (see Figure 7). In October of 1983, the consultant conducted a land use inventory to supplement and update previous studies. Current land uses in the project study area are illustrated in Figure 8. As indicated in this figure, residential uses predominate the areas north and west of South Avenue and to the north and east of North Avenue.

Discussions with planning staff and residents of the area revealed that these residential areas have been relatively stable over the last ten years. Although several new homes and a major apartment complex have been constructed within two blocks of Reserve Street, no additional major subdivisions are anticipated in the project area.[33]

Commercial, public and semi-public uses within the project area have been increasing in the last ten years. Major commercial enterprises located along the roadway include Rosauer's, Peterson Motors, Sunshine Motors and the 4B's Restaurant. Approximately ten other businesses have been established within two blocks east or west of Reserve Street during this period. Numerous home-occupations and a neighborhood grocery store also exist within the area. Larchmont Municipal Golf Course, the National Guard Armory, C.S. Porter School, and several churches comprise the public and semi-public land uses within the project study area. Big Sky High School, Missoula Community Hospital and medical complex, and a large park are located nearby but out of the immediate project area.

The land use trend for properties adjacent to Reserve Street and generally south of South Avenue appears to be toward a strong commercial area. North of this point, land uses may be expected to convert from a predominantly residential area to one with a mixture of single-family and multi-family residential dwellings with commercial and office space development, regardless of this project. This point is reiterated in the following discussions contained in the Reserve Street Area Plan[25]:

> "Conflicts between long-standing residential uses and increasing auto/truck traffic along these major thoroughfares will increase in the future. As traffic continues to build up, two major changes occur. One is that pressure for commercial development increases. An examination of commercial development in other areas indicates that commercial property usually develops on streets carrying 10,000 vehicles or more per day. Reserve Street and the east leg of South Avenue at Reserve are presently carrying this amount. Also, commercial development on streets with lighter volumes tends to occur when those streets intersect with streets having larger volumes.
>
> Second, noise increases as traffic volumes increase. Noise on streets carrying 10,000 vehicles per day is around 65 decibels, but as commercial traffic increases, this level rises to 80 decibels or more. From a residential viewpoint, 70 decibels is considered the maximum tolerable (outdoor) level. Attempts should be made to discourage residential uses directly adjacent to streets carrying or expected to carry 10,000 vehicles per day."

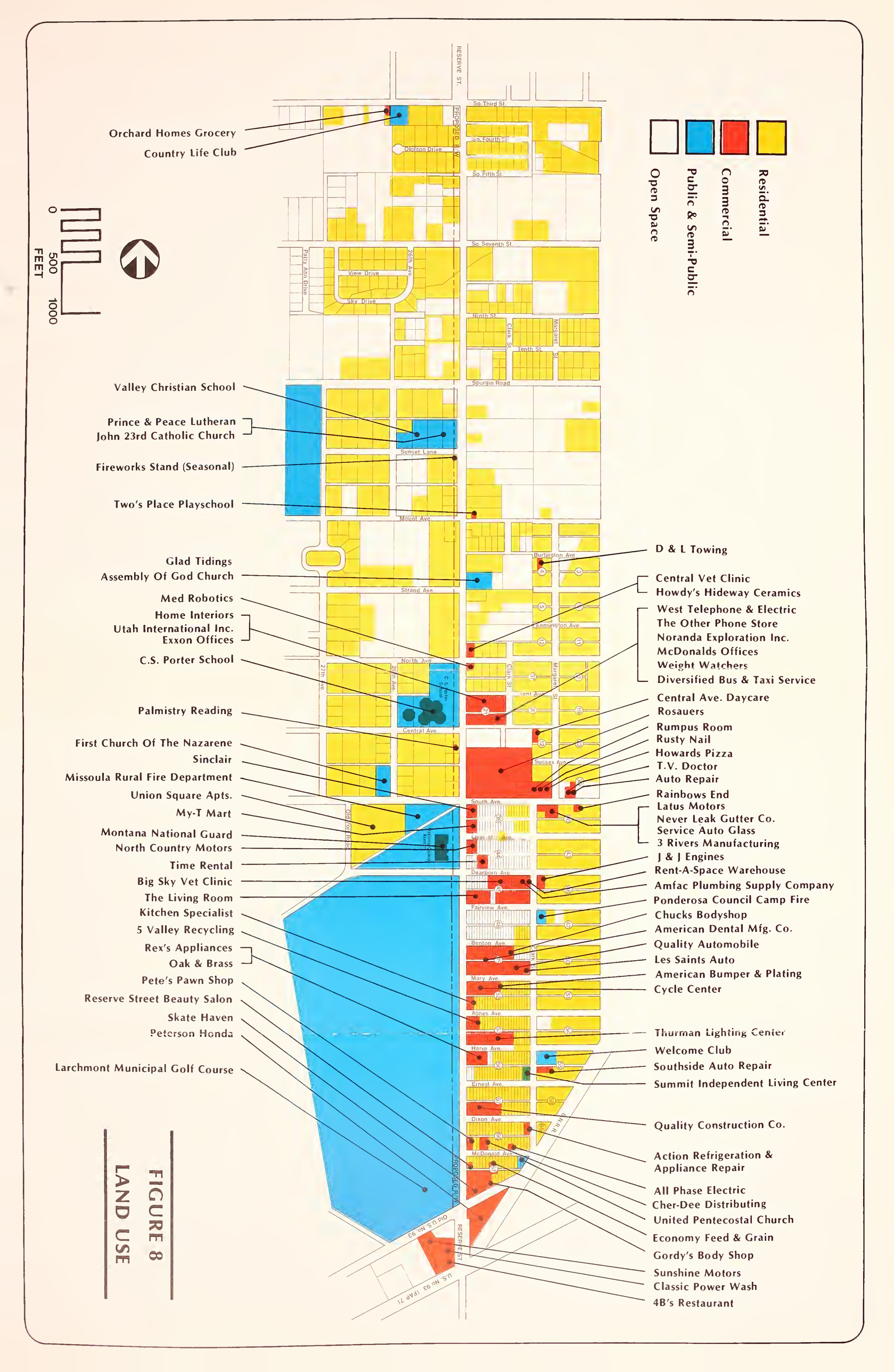


FIGURE 8
LAND USE

c. Comprehensive Planning

The existing Countywide Comprehensive Plan designated the portion of the study area adjacent to Reserve Street and generally north of South Avenue as single-family to medium density residential. Areas from South Avenue to U.S. 93 and to the west of Reserve Street were designated for parks and semi-public uses. Land uses to the east of Reserve Street and extending from South Avenue to U.S. 93 were designated as neighborhood commercial, medium family residential, general commercial, and light industrial. The Missoula Planning Office is currently in the process of preparing an updated county comprehensive plan, slated for completion by the end of 1984.

In the interim and as a response to the proposed widening of Reserve Street, the Missoula Planning Office prepared the Reserve Street Area Plan in 1980. This plan, which supercedes all other plans for the area, generally allows multi-family residential and limited commercial development, such as offices, to mix with the existing residential areas north of Spurgin Road. Between Spurgin Road and North Avenue, multi-family residential and a variety of commercial enterprises would be permitted. The area on the northeast corner of the Reserve Street and South Avenue intersection and the entire east side of Reserve Street from this intersection southward received new types of commercial designations.(25)

d. Zoning

Prior to 1980, most of the land for one mile east and west of the roadway was covered by City or County zoning. County zoning still remains in effect for the area south of Central Avenue where properties on the east side of Reserve Street have been designated either commercial and/or residential. The golf course property is unzoned. After the adoption of the Reserve Street Area Plan, a special development permit district was developed for a portion of the Reserve Street area. This area, known as District No. 2, was adopted to replace zoning along Reserve Street between Central Avenue and South Third Street. This special district allows both commercial and residential uses within the area, provided certain site development standards, including noise attenuation, are met. In general, the more intensive the use, the greater the number of required site improvements.(33)

The District was implemented in an attempt to reach a compromise between those residents of the area wishing to develop their property commercially and those residents living away from Reserve Street who fear that commercial development will devalue their property. The permit system has drawn opposition from residents of the area who view it not as a remedy to the problem, but as an overly complicated and

expensive regulation that leaves uncertain the highest and best use of their property. Two development applications have been submitted and approved since the implementation of the system.(33)

4. COMMUNITY INFRASTRUCTURE & LIFESTYLE

The study area lies primarily within the unincorporated portion of Missoula County; however, a small portion of the area is within the Missoula City Limits. Therefore, with the exception of a narrow strip of land along South Third Street and portions of the Fort Missoula block, which includes the Union Square Apartments and the National Guard Center, services are provided almost exclusively by County agencies. The following description of services has been compiled from existing documents and updated as necessary.(25)

a. Schools

Five elementary schools exist within School District No. 1 and are located near the study area. These schools include: Dickinson, Franklin, C.S. Porter, Hawthorne and Jefferson. C.S. Porter School, which is located adjacent to Reserve Street, was originally utilized as an elementary school facility. However, recent policy changes by the School Board have determined that the facility is best suited for 7th and 8th grade students. One of the major factors contributing to this change was concern for the safety of the students required to cross Reserve Street. Current school boundaries have been modified to minimize the need for students to cross Reserve Street. The present (1983-84) enrollment at C.S. Porter School is 300 students. Big Sky High School, located west of Reserve Street on South Avenue, also serves older students of District No. 1. Valley Christian School, a private facility, is located one block west of Reserve Street on Sunset Lane.

b. Law Enforcement

Law enforcement for much of the study area is provided by the Missoula County Sheriff's Department, which patrols the area through specific neighborhood assignments and with a roving deputy. The City and County jointly provide protection for the Fort Missoula area. Through a cooperative agreement, with both City and County law enforcement agencies, the Montana Highway Patrol has assumed the responsibility for the investigations of traffic accidents along Reserve Street.

c. Emergency Services

Fire protection within the project study area is provided by the Missoula Rural Fire District and the Missoula Fire Department. The Missoula Rural Fire District maintains a fire station near the intersection of South Avenue and Reserve Street and utilizes volunteer and professional firemen. the Thirty-Ninth Street Station, manned by the City Fire Department personnel, is located approximately five minutes from the study area.

Emergency medical services for the study area are provided by Arrow Ambulance Services and emergency medical technicians who are on the staff of both fire departments. Missoula's Community Hospital, which is located west of Reserve Street, is easily accessible by either South Avenue or Dearborn Avenue. This facility provides a variety of medical services and is staffed twenty-four hours per day to handle emergency situations within the community.

5. ECONOMY

a. Overall Economic Base

The Missoula area economy has experienced an overall pattern of growth. Economic indicators such as population growth, non-farm income, and per capita income show long-term positive gains. However, the Missoula economy is also the most cyclical of the economies of Montana's major urban areas.[24] This condition results in periods of generally poor economic performance, such as during the mid 1970's and early 1980's.

Major elements of the Missoula area economic base are education (the University of Montana), manufacturing (mainly the wood products industry), and federal government and other state government employment. The area's basic economy also benefits from provision of the goods and services to the university's sizable non-local student population, and the urban area's role as the regional trade center for western Montana. The Missoula trade area encompasses a seven-county area with a population of 140,000. Tourism also contributes to the area's basic economy.

The cyclical nature of the Missoula area economy is primarily due to variation in the activity levels of the area's wood products industry. Demand for western Montana wood products differs widely from year to year, causing fluctuation in employment and income of industry workers, and demand for inputs from businesses providing support services to the industry. Derivative economic effects cause variations in

activity levels of the wood products industry to be reflected in expanded or reduced demand for goods and services from other elements of the Missoula economy.

b. Population Growth and Income

Between 1970 and 1980, Missoula County population grew by 30 percent, an indication of an expanding economy. The county's population is projected to growth another 24 percent by 1990. Non-farm income grew by 6.5 percent from 1970 to 1973, and by 9.5 percent from 1975 to 1979. However, in 1974 and 1975 and in the early 1980's, non-farm income actually declined, a result of locally poor economic conditions. Per capita income in Missoula experienced a real dollar increase of 33 percent between 1970 and 1980. The county's per capita income was $8,400, which was slightly lower than in the state's other major urban areas, a result of the county's large student population.

c. Labor Force and Employment Characteristics

Between 1972 and 1980, the Missoula County labor force grew from 25,649 to 36,177. In January, 1984, the county's civilian labor force was approximately 36,000, showing little change since the last census.(34)

Employment and unemployment in the county varies seasonally and from year to year. In 1983, highest unemployment occurred in January (10.6%), and the lowest unemployment occurred in September (6.0%). Fluctuations are mainly the result of seasonal labor demand in the wood products and construction industries.(34)

Annual differences in unemployment are also mainly due to variations in wood products industry activity. In 1983, county unemployment averaged 8.1 percent. In 1981 and 1982, annual unemployment averaged 9.2 percent.(34)

The general distribution of employment in the county by employer category is depicted in the following table:

TABLE NO. 5

EMPLOYMENT DISTRIBUTION
MISSOULA COUNTY, MONTANA
(1979)

Government	7,158
Services	6,429
Retail Trade	6,357
Manufacturing	4,819
Transportation & Public Utilities	2,431

(Source: U.S. Dept. of Commerce, REIS, 1981)

d. Project Area Economy

Employers directly along Reserve Street include approximately fifty private businesses, most of which are located south of Central Avenue on the east side of Reserve. About ten businesses are located north of Central. The location of businesses within the study area is shown in Figure 8, "Land Use".

Public and semi-public employers include C.S. Porter School, the National Guard Armory, a hospital, five churches, and a few health care and social service organizations.

Residents of the study area have access to jobs throughout the Missoula urban area. Resident employment may be, but is not necessarily related to employment opportunities in the Reserve Street area. Portions of Census Tracts 8, 9 and 10 are included in the study area. In 1980, the total labor force in these tracts consisted of 6,702 persons, or approximately 24 percent of the county's total labor force. The area had a 7.9 percent unemployment rate, with 480 unemployed persons.(35)

6. TRANSPORTATION SYSTEMS

a. Road and Street System

The road and street system in the study area ranges from gravel-surfaced streets serving local access needs to paved highways which serve as local and regional connecting links. Reserve Street is the most important link of the road and street system in the study area, since it serves not only as a major arterial route for local residents but also as a north-south line for state and interstate traffic. Reserve Street is heavily utilized by truck traffic as a through route from Interstate 90 to U.S. 93 (FAP 7) which extends southward through the Bitterroot Valley and U.S. 12 extending to Idaho via Lolo Pass. This latter route is used extensively by truckers hauling grain to the barge facilities at Lewiston, Idaho.

Three important local streets, South Avenue, South Seventh Street and South Third Street, intersect with Reserve Street within the study area and play an important role in Missoula's street network. The importance of these streets is reflected in their designation as Federal Aid Urban Routes. Traffic on South Avenue (FAU 8120), the busiest of these urban routes, is generated by residental development, Fort Missoula, Community Hospital and Big Sky High School in areas west of Reserve Street and commercial "strip" development and Southgate Mall to the east. Both South Third Street (FAU 8102) and South Seventh Street (FAU 8114), are utilized as connecting links to central and downtown areas of Missoula.

b. Air Service

The study area is served by Missoula County Airport, which is located approximately three miles northwest of the study area. The airport, which is publicly owned and operated by the County Airport Authority, is utilized by four commercial air carriers which offer air cargo and passenger service. Several charter services and the general flying public also utilize Johnson-Bell Field.

c. Rail Service

Burlington Northern Railroad provides rail service within the Missoula area. A branch line, which heads southward into the Bitterroot Valley, crosses Reserve Street at its intersection with U.S. 93. This track is utilized about once per week during daylight hours for local freight

deliveries.[36] Passenger rail service is not available to Missoula area residents.

d. Public Transportation

Residents of Missoula are served daily by three commercial inter-city bus lines, which offer both passenger and freight delivery service. Much of the urban Missoula area is served by a public bus system, known as the Mountain Line. This system, which is operated by the Missoula Urban Transportation District, has established bus routes which cross Reserve Street at both South Avenue and South Third Street. Although, no stops are made on Reserve Street, buses generally stop at approved areas located about a block away from Reserve Street intersections. It is estimated that buses make fifty-one trips per day through the Reserve Street-South Avenue intersection, and twenty-four trips per day through the Reserve Street-South Third Street intersection. In addition, a new route which includes Reserve Street and extends from U.S. 93 to Mary Avenue, is traveled seventeen times per day. Stops are made infrequently along this portion of Reserve Street, since no designated bus stops are located on the street and potential riders must hail the bus. High traffic volumes, the physical characteristics of the roadway, and the low density of development in the area are responsible for the absence of bus stop locations along Reserve Street.[37]

7. TRAFFIC

a. Traffic Counts

There are three sources of information that provide data on traffic volumes: 1) traffic surveillance counts that are taken periodically in the Missoula urban area; 2) turning movement counts taken at intersections specifically for this EIS; and 3) a permanent traffic counter located on Orange Street at the south end of the Orange Street Bridge that provides information on traffic characteristics in Missoula.

The traffic surveillance counts are taken not less than once each year by MDOH personnel using portable machine counters. These counts are seasonally adjusted to an annual average daily traffic using adjustment factors based on the permanent counter in Missoula located on Orange Street. Because these counts are usually from one to three days in length, they provide an approximation of the traffic occurring at that location. They give an indication of traffic trends within the limits of their accuracy, usually judged to be within ten percent for an urban area such as Missoula.

Manual turning movement counts were taken at eleven intersections along the Reserve Street project corridor. These counts included the signalized intersections at U.S. 93, South Street, and South Third Street, as well as the eight other most important intersections. Counts were taken at morning, noon and evening peak periods and recorded at 15-minute intervals. The maximum peak occurred in the afternoon, usually between 4:30 p.m. and 5:30 p.m. Figure No. 9 shows the location of the surveillance counts and the turning movement counts on Reserve Street.

A permanent counter located at the south end of the Orange Street Bridge provides a continuous record of the traffic volumes and characteristics, and information on traffic trends in Missoula.

b. Traffic Variations

1) ANNUAL TRAFFIC

The permanent traffic counter on Orange Street in Missoula provides information on annual traffic variations. This traffic counter has been in operation since 1966; however, the past ten years of counts provide the best historical perspective. Figure No. 10 graphically shows the traffic pattern for this period. Note that peak traffic occurred in 1978 and 1979, with a decline in the recession years of 1980 and 1981. Traffic leveled off in 1982, and projected traffic volume for 1983 shows a return to 1978-79 levels.

Also shown in Figure No. 10 is the annual average daily traffic for Reserve Street estimated from MDOH surveillance counts. There are some differences in the surveillance counts along Reserve Street with the north end of the project area near South Third having somewhat higher traffic volumes than the south end near U.S. 93. However, the difference is not within the accuracy of the surveillance counts, and so an average of the three count locations in the project area was used. From this graph it can be seen that the traffic volumes increased dramatically after the Reserve Street Bridge was completed and opened in June 1979. Traffic, before the bridge was opened, was about 8,000 vehicles per day (VPD) and increased to about 13,500 VPD after the bridge was opened. The traffic has ranged from about 12,000 to 13,500 VPD since then.[38]

2) MONTHLY VARIATIONS IN TRAFFIC

Monthly variations in traffic flow can be established from the permanent

FIGURE 9

TRAFFIC MONITORING LOCATIONS

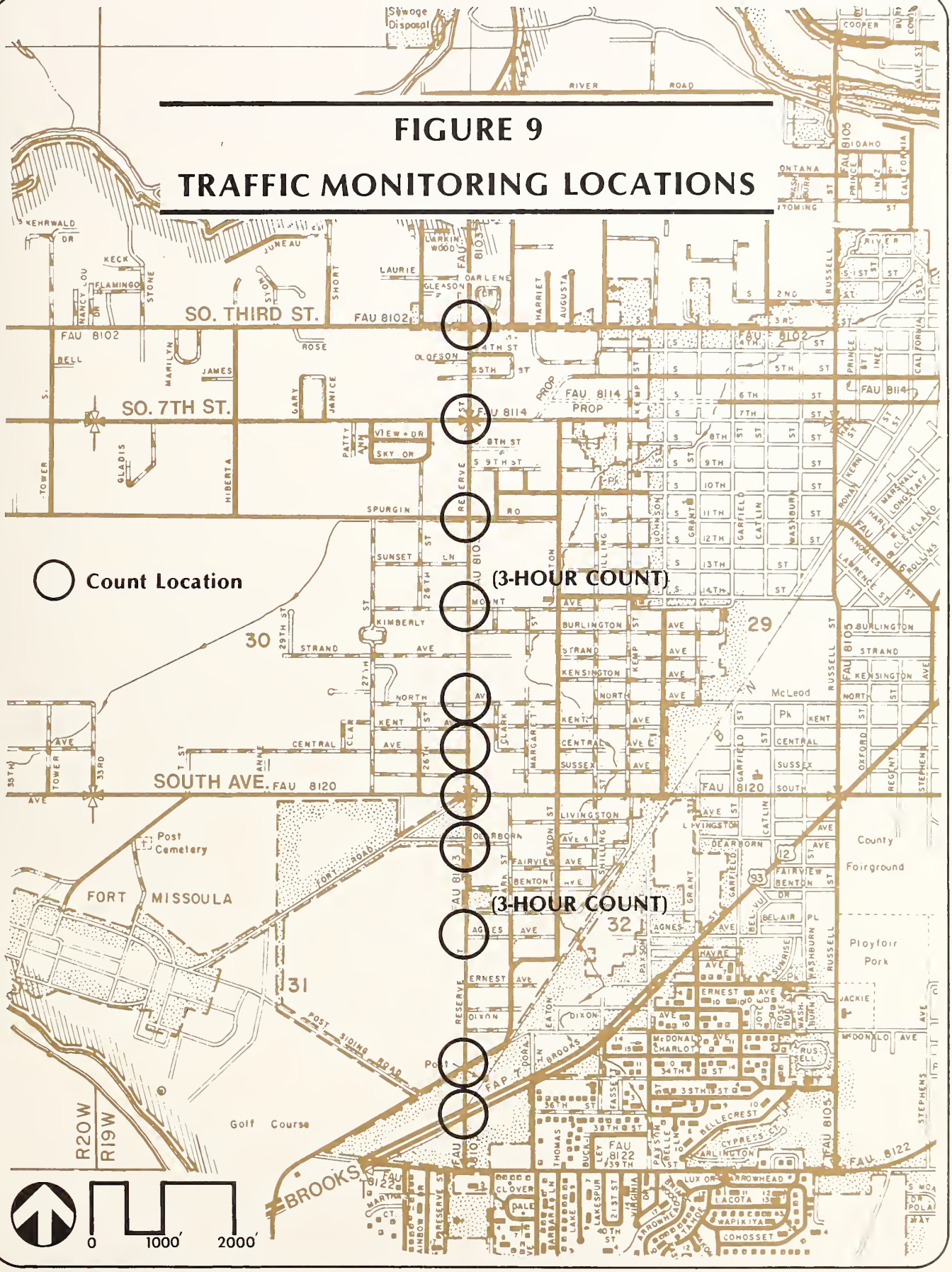
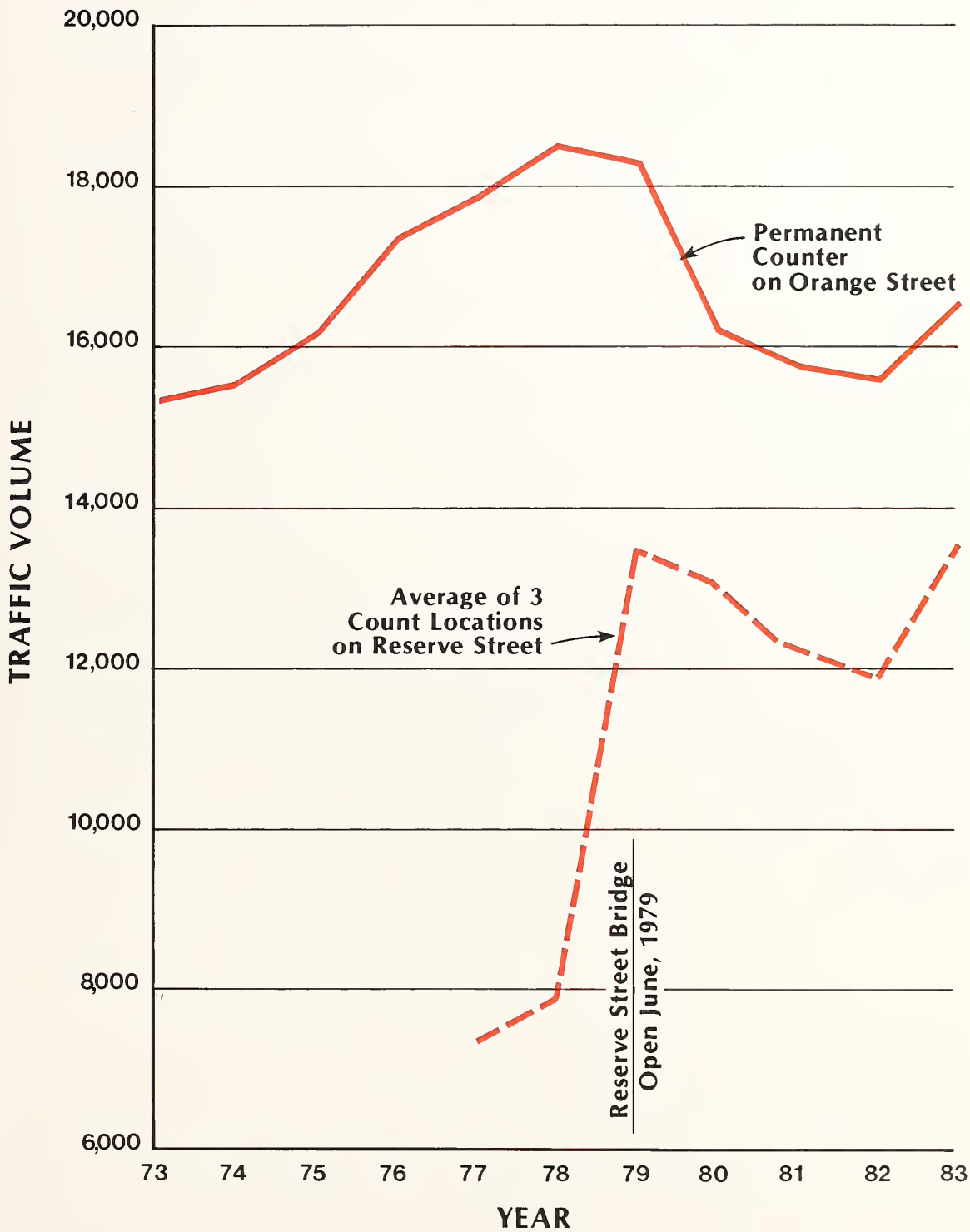


FIGURE 10

ANNUAL VARIATION IN TRAFFIC VOLUMES



counter on Orange Street. Figure No. 11 shows the monthly variation in traffic for 1982 for the annual average daily traffic. Note that the peak period for traffic occurs from May through October, with June, July and August being the peak months. The lowest traffic volumes occur in January, which is common for Montana.

3) HOURLY VOLUME VARIATIONS IN TRAFFIC FLOW

Hourly volume variations are also significant because they show the time during the day when the demand on the streets is the greatest. Figure No. 12 shows the hourly volume variation in traffic in the project study area. An average of the three surveillance count locations that were taken in late March and early April of 1983 adjusted to an annual average volume was used to prepare the graph.

Computations and traffic records are on file with the Montana Department of Highways in Helena and are available for review during regular working hours.

c. Traffic Projections

Traffic for an urban arterial street such as Reserve Street is due primarily to the ability of the street to carry traffic, travel times, and the traffic generated in the urban area that desires to travel along the street corridor. Traffic traveling through the urban area also contributes to the traffic volumes but to a lesser degree. Because of these factors, it is not practical to apply historical growth to project future traffic.

The most common method of predicting travel in an urban area is to use a traffic assignment model. This type of model commonly uses traffic generator parameters such as population and employment, and combines these with travel desires between traffic zones to approximate traffic on an urban area major street network.

An Urban Transportation Plan done for the Missoula Urban Area in 1967 used such a technique to predict traffic volumes in Missoula through 1985.[39] More recently, a traffic assignment model prepared in 1974 predicted traffic through the year 2000. At the time these traffic assignments were done, Reserve Street did not extend to Interstate 90; however, both models predicted traffic based on the Reserve Street Bridge being in place and Reserve connecting to Interstate 90.

The following table shows the traffic volumes that were predicted in the

Reserve Street Study Area as well as 1983 actual traffic volume estimates based on MDOH surveillance counts.

TABLE NO. 6

FUTURE TRAFFIC PREDICTION
FROM TRAFFIC ASSIGNMENT MODELS

Source	US 93 to South Ave.	South Ave. to Spurgin	Spurgin Rd. to S. 3rd
Urban Transportation Plan, 1985 Prediction	9,200	10,300	11,800
Missoula Transportation Plan Update, Tech. Report #2:			
1980 Prediction	10,076*	12,652*	12,658*
1985 Prediction	12,237*	15,141	15,232
2000 Prediction	16,449*	20,186*	20,410*
1983 Actual Volumes	13,360	13,400	13,890

* Average volumes

The prediction models showed a significant difference in traffic from one end of Reserve Street to the other. However, the actual counts taken in 1983 indicate that the traffic is relatively constant for the entire project length. It is judged that within the limits of accuracy that future traffic can be estimated, the traffic will be about the same for the entire project length.

Based on the current traffic plus the prediction models, it is estimated that future traffic on Reserve Street will be as follows:

TABLE NO. 7

FUTURE TRAFFIC ON RESERVE STREET

Year	Traffic
1985	14,000
1990	16,000
1995	18,000
2000	20,000
2005	22,000

FIGURE 11

MONTHLY VARIATION IN TRAFFIC VOLUMES

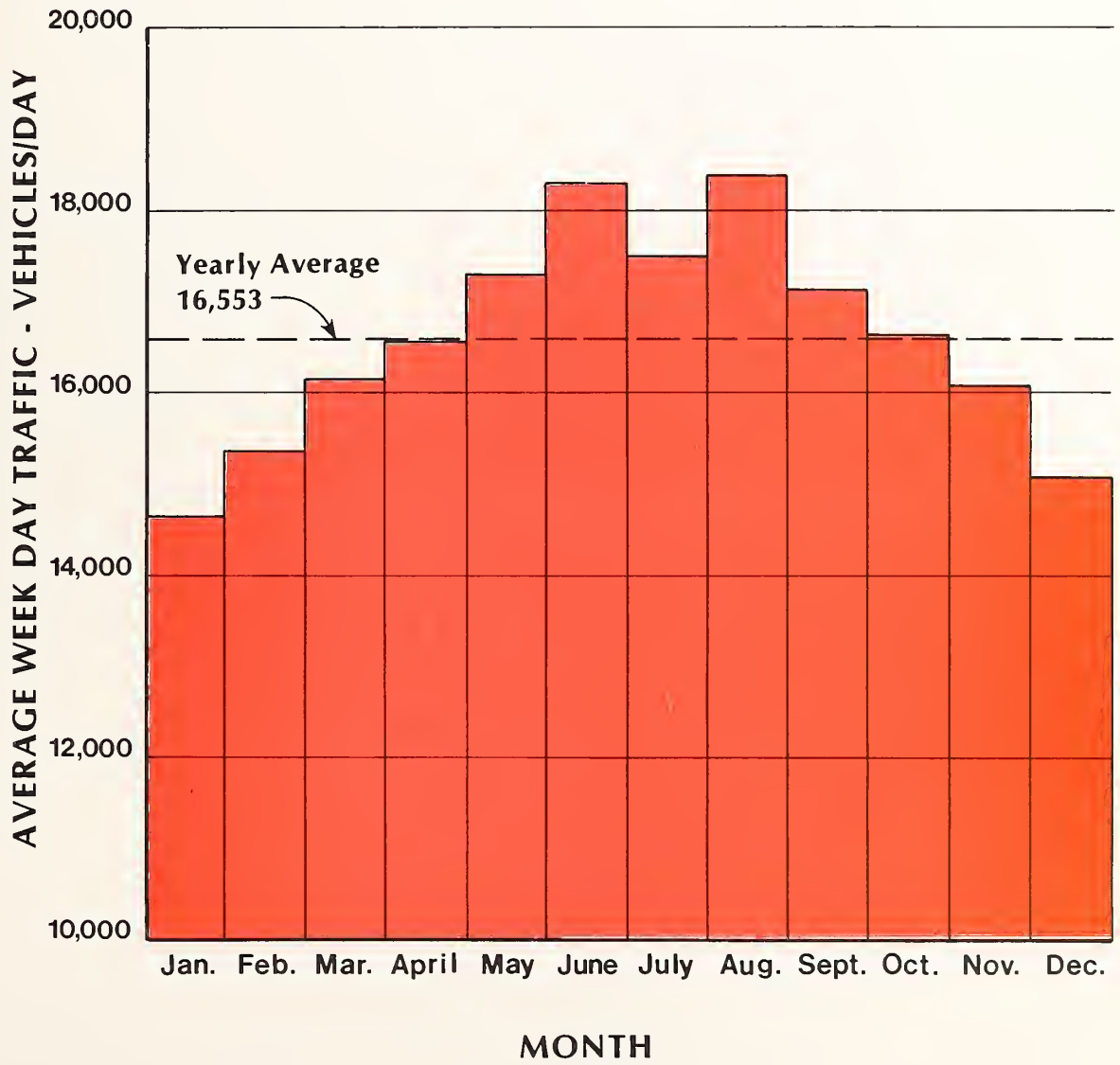
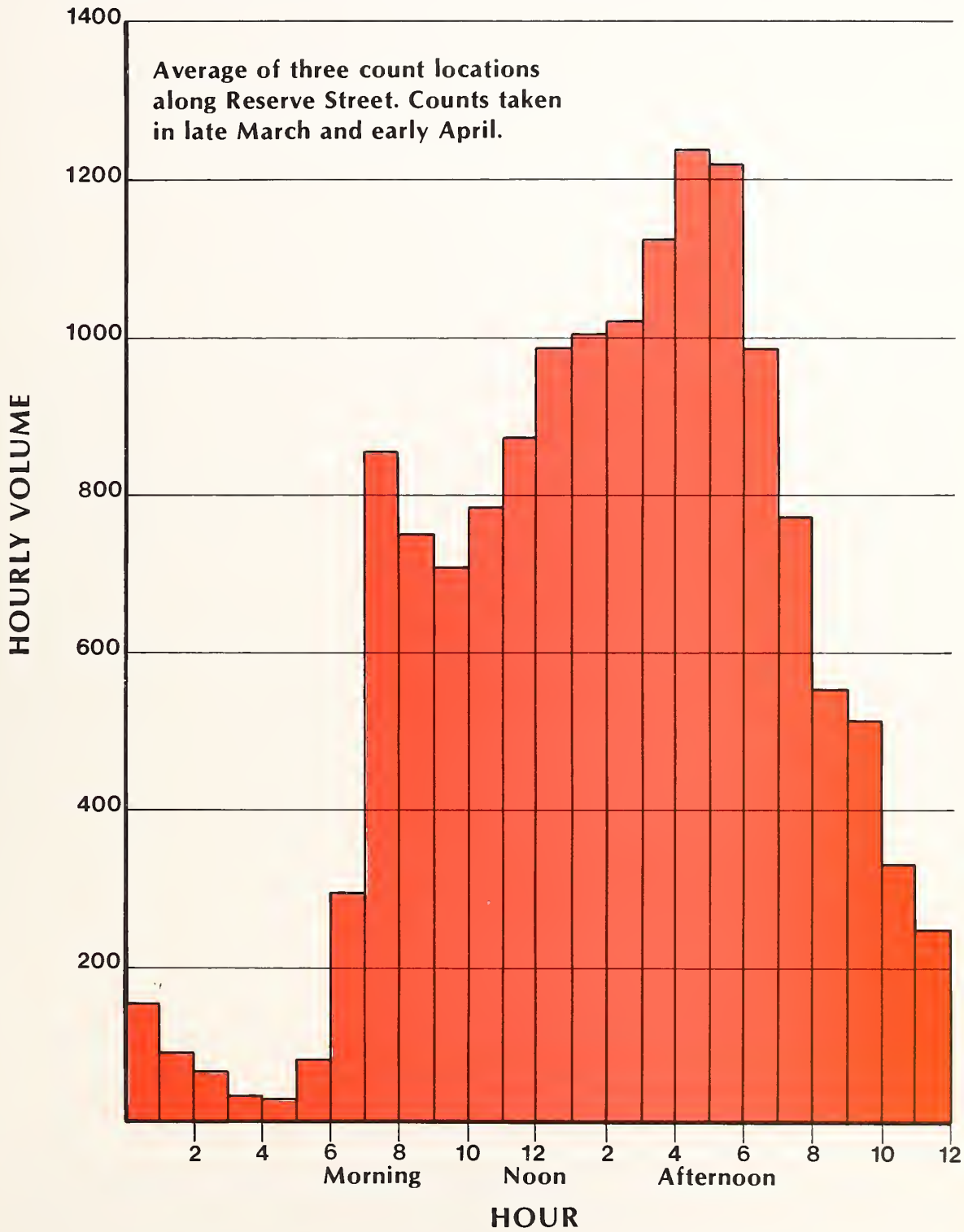


FIGURE 12
HOURLY VARIATION IN TRAFFIC VOLUMES



It should be recognized that these traffic predictions are an approximation assuming no restrictions on capacity and that economic conditions, type of roadway, urban growth, and various other factors could influence these estimates. However, it is our judgment, based on the information available, that these are realistic estimates.

d. Design Hourly Volumes

Highways are typically designed for traffic volumes that are very seldom exceeded during the year. The most common criteria is the 30th Highest Hourly Volume (that hourly volume which is exceeded only 29 times during the year). This criteria is considered to be valid for the Reserve Street project.

The permanent counter on Orange Street provides information on traffic characteristics in Missoula, which can be used as an indication of the 30th Highest Hourly Volume. For the past five years, the 30th Highest Hourly Volume has ranged from 10.3 to 11.7 percent of the Annual Average Daily Traffic (AADT). The average for this five years is 10.8 percent. This is the Design Hourly (K) factor that will be used for Reserve Street. Using this factor, the following design hourly volumes are estimated:

TABLE NO. 8

DESIGN HOURLY VOLUMES (DHV)

Year	DHV
1985	1,512
1990	1,728
1995	1,944
2000	2,160
2005	2,376

e. Pedestrians and Bicyclists

1) COUNT LOCATIONS

Traffic monitoring stations were located at many key Reserve Street intersections for either a seven-hour count period or a three-hour "peak period" count during October and November of 1983. In addition to vehicular traffic volumes (including turning movements) pedestrian and

bicyclist activities were observed at these locations. Eleven Reserve Street intersections within the study area including two intersections near C.S. Porter School were selected for the manual count observations. Count locations along this section of Reserve Street are depicted in Figure 9.

2) GENERAL PEDESTRIAN/BIKER OBSERVATIONS

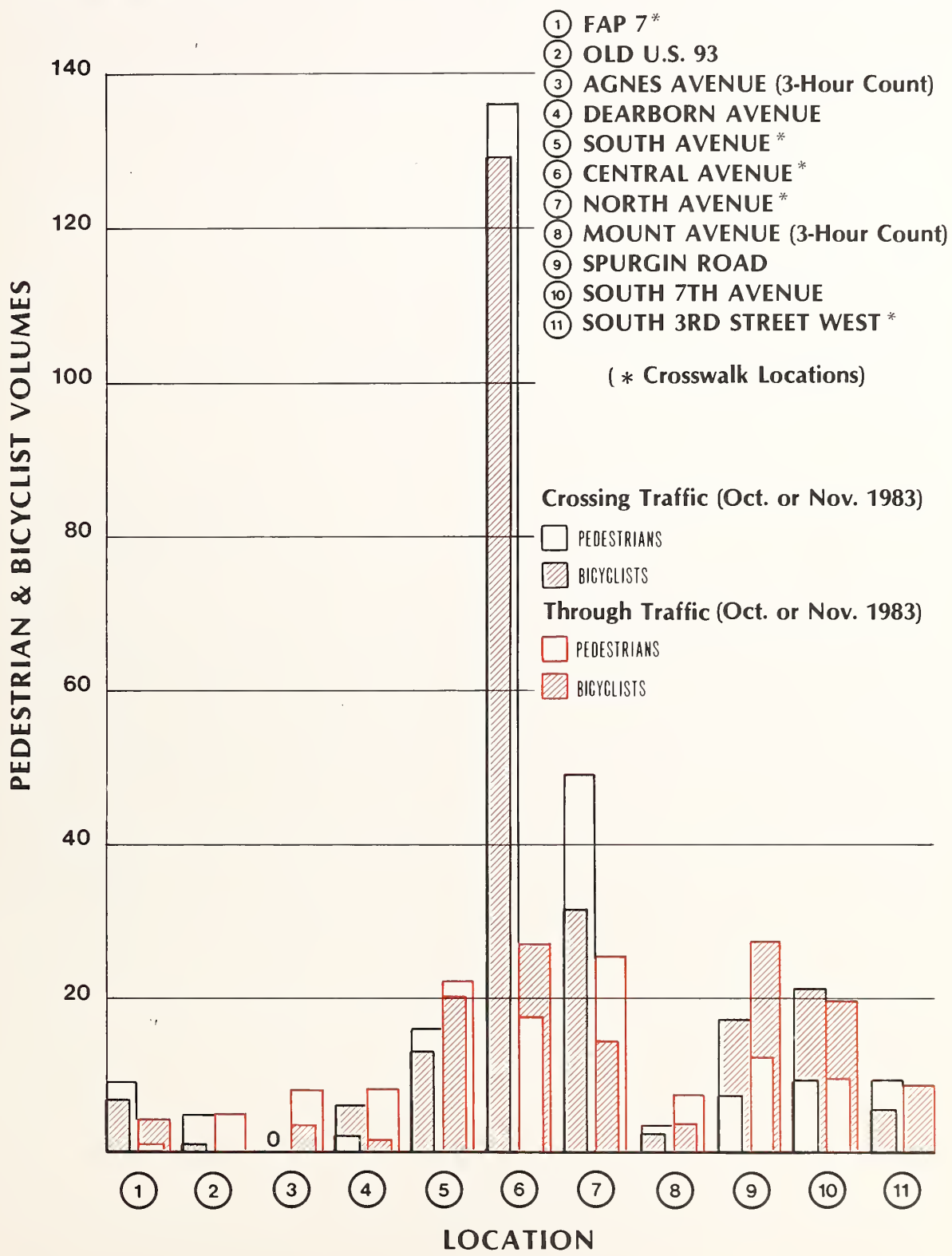
Use of Reserve Street by pedestrians and bikers can be described by an analysis of the pedestrian and bicyclist traffic crossing the roadway as opposed to traveling along the highway. The results of the intersection monitoring indicated that the majority of the pedestrians and bicyclists cross the roadway. Out of a total of 724 pedestrians and bikers counted, 477 were observed crossing and 247 were observed traveling along Reserve Street. Crossing and through-traffic counts of pedestrians and bicyclists are shown in Figure 13. Crossing volumes during the October and November monitoring periods were highest by far at the Central Avenue and North Avenue intersections due to the large amount of crossing traffic in the vicinity of the school.

Several factors account for the large volumes at these locations near C.S. Porter School. The Central Avenue location, the most heavily used crossing point by pedestrians and bicyclists along much of the pedestrian and bicyclist traffic observed at the location, especially during a half-hour period preceding the start of school and during the noon hour. Large numbers of school age pedestrians and bicyclists also crossed at this location for a period of an hour after school concluded for the day. Much of the traffic consisted of students returning home after school; however, numerous children were observed returning to the school or initially heading home well after 4:00 p.m. It is assumed that this traffic results from school sponsored activities after school or from children returning to the school grounds to engage in free play activities.

Another factor which is an important consideration in the interaction of pedestrian and vehicular traffic in the area near C.S. Porter School is the location of designated crosswalks. Both the Central Avenue and North Avenue intersections are equipped with designated crossings preceded by school warning signs and flashing amber signals. It is interesting to note that during the October observation period at these locations a majority of all pedestrians and bicyclists utilized the crossings. At the Central Avenue crossing 85 of the 136 pedestrians and 75 of the 129 bicyclists observed at the location, utilized the crosswalk facility. At North Avenue, 41 of the 49 pedestrians and 13 of the 31 bicyclists used the crosswalk.

Numerous instances were observed at both locations near the school of drivers failing to allow pedestrians or bicyclists in the crosswalk to cross Reserve Street. This situation was more prevalent during the 3:00

FIGURE 13 – PEDESTRIAN & BICYCLIST ANALYSIS



p.m. to 6:00 p.m. observation period than other times of the day and then required pedestrians or bicyclists to wait at the edge of the roadway for periods approaching five minutes.

Pedestrian and bicyclist traffic at other locations along Reserve Street was generally quite low. The Spurgin Road, South Avenue, South Seventh Street and South Third Street West intersections were observed to have the most pedestrian and bicyclist activity of the remaining monitoring locations. Designated crosswalk facilities with pedestrian-actuated controls are located at U.S. 93, South Avenue and South Third Street West. In most cases, pedestrians and bicyclists utilized the crosswalk facilities due to the amount of motor vehicle traffic at the intersection. It should also be noted that the majority of the pedestrians and bicyclists observed at Reserve Street locations other than near C.S. Porter School, were adults. Much of the traffic observed at these locations consisted of through traffic rather than crossing traffic indicating that the route is often used by commuters.

8. TRAFFIC SAFETY

a. Existing Roadway

Hazardous traffic situations are created by several physical features common to the section of Reserve Street between U.S. 93 (FAP 7) and South Third Street West (FAU 8102). In addition to the narrow width of much of the roadway, numerous intersections and driveway approaches to Reserve Street are partially hidden from oncoming traffic by terrain, roadside vegetation or development. The intersections of Mount Avenue, Spurgin Road and South Seventh Street with Reserve Street are typical examples of this situation. Photograph 6 in Part I of this EIS depicts this condition near Spurgin Road. There are very few existing facilities for pedestrians or bicyclists with virtually no sidewalks and painted crosswalks located only at the intersections of Reserve Street with U.S. 93 (Brooks Street), South Avenue, Central Avenue, North Avenue and South Third Street West. The crosswalks at U.S. 93, South Avenue and South Third Street West are equipped with pedestrian-actuated crossing signals. Flashing amber pedestrian signals and school speed limit signs are located in advance of both crosswalks at Central and North Avenues. The remainder of this portion of Reserve Street is typically signed for 35 mile-per-hour travel.

b. Traffic Accidents

A detailed investigation of accidents occurring along Reserve Street within the project study area was conducted to establish current accident characteristics. The Montana Department of Justice maintains accident records for each roadway in the Montana Highway Information System (H.I.S.) program. Accident records for a three-year period extending from October 1, 1980 through September 30, 1983 for this portion of Reserve Street were obtained, tabulated and plotted by location. Similar information was obtained for other FAU routes which intersect Reserve Street including South Avenue, South Seventh Street and South Third Street West. Access to individual accident reports through the Montana Department of Justice, Highway Traffic Safety Division allowed each accident to be examined in detail with regard to location and contributing factors. Figure 14 shows the locations of the 189 accidents which occurred within the study area during the three-year analysis period. Table No. 9 contains a summary of the primary characteristics for these reported accidents.

Based upon an average of traffic volumes for the three-year study period and the length of the study section, the overall accident rate for this portion of Reserve Street was determined to be 6.441 accidents per million vehicle miles of travel. During the study period, 54 injury accidents occurred resulting in injuries to a total of 87 persons. The rate for accidents which involved injuries was determined to be 1.840 accidents per million vehicle miles of travel. No fatalities were recorded along this section of Reserve Street during the accident study period.

c. Intersection Studies

As indicated in Figure 14, approximately 80 percent of the reported accidents occurred at intersections along Reserve Street, with 57 percent of the accidents occurring at only six intersections (Third, Seventh, Spurgin, Mount, South and Brooks). The high number of accidents experienced at those six locations may be attributed to the large cross street volumes and the amount of turning movements at each site.

Accident rates for each of the six major accident locations are presented in Table No. 10. The intersections have been divided into two categories, signalized and unsignalized intersections. The information shown in the table is based on three years of accident data and a total volume of approach vehicles for the same three year period.

TABLE NO. 9

ACCIDENT DETAILS SUMMARY
October 1, 1980 - September 30, 1983

CIRCUMSTANCES		1980 (part)	1981	1982	1983 (part)	TOTAL
Total Accidents for Section		15	62	62	50	189
Light	Day	8	50	46	35	139
	Night	7	12	16	15	50
Weather/Road	Clr/Dry	8	47	31	28	114
	Clr/Wet*	3	3	9	1	16
	Cldy/Dry	-	-	6	8	14
	Cldy/Wet*	4	12	16	13	45
Single-Car Accidents		2	4	7	9	22
Collision Type (two vehicles)	Head On	-	-	2	1	3
	Rear End	7	29	26	25	87
	Angle	5	27	22	14	68
	Side/Pass	-	1	3	-	4
	Side/Meet	1	-	1	1	3
	Other	-	1	1	-	2
Multi-Car Accidents (3 or more vehicles)		1	6	6	3	16
Contributing Factors	Drink	2	4	5	5	16
	Speed	6	16	12	11	45
	Other**	4	30	28	28	90
Pedestrian-Related		-	-	1	-	1
Bicycle-Related		-	-	-	2	2
Injury Accident/ Number of Injuries		3/6	19/29	17/28	15/24	54/87

* "Wet" includes rainy, snowy and icy road conditions.
** "Other" includes improper pass/turn, failure to yield right-of-way, failure to signal, reckless driving, etc.

TABLE NO. 10

EXISTING INTERSECTION ACCIDENT RATES

FOR RESERVE STREET

Signalized Intersections	Number of Accidents	Million Vehicles Entering	Accident Rate (ACC/MVE)
Brooks & Reserve	20	25.03	0.80
South & Reserve	28	24.78	1.13
Third & Reserve	6	20.73	0.29
TOTAL	54	70.54	

Average Intersection Accident Rate = 0.74 ACC/MVE

Unsignalized Intersections	Number of Accidents	Million Vehicles Entering	Accident Rate (ACC/MVE)
Mount & Reserve	10	14.28	0.70
Spurgin & Reserve	24	14.90	1.61
Seventh & Reserve	20	14.73	1.36
TOTAL	54	43.91	

Average Intersection Accident Rate = 1.22 ACC/MVE

d. Pedestrian and Bicyclist Accidents

As shown in Table No. 9, it can be noted that several pedestrian and bicyclist accidents have occurred along Reserve Street between U.S. 93 and South Third Street West. Since 1980, two pedestrian-related accidents and three bicycle-related accidents were investigated along the corridor. Details of the pedestrian or bicycle-related accidents are summarized in Table No. 11. It should be noted that of the five accidents identified in this table, two accidents occurred prior to October 1980,

RESERVE STREET AND SOUTH SEVENTH STREET

Total of 10 Accidents for Period
5 Rear End Collisions
3 Angle Collisions

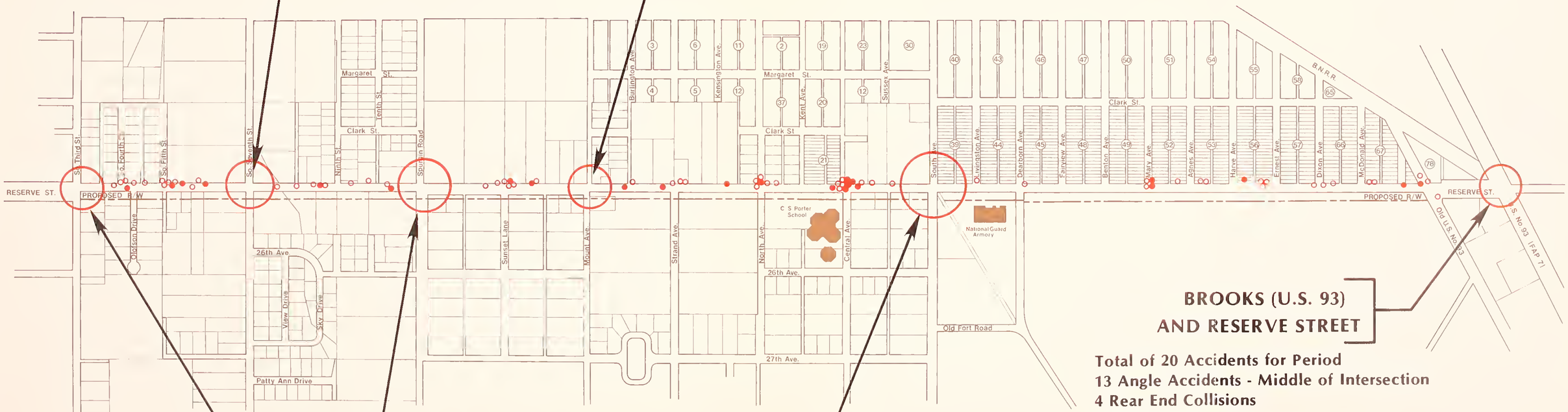
RESERVE STREET AND MOUNT AVENUE

Total of 20 Accidents for Period
10 Rear End Collisions
7 Angle Collisions
3 Fixed Object - Single Vehicle Collision
17 Daytime Accidents

0 500 1000
FEET

Property Damage Accident
Injury Accident

Note: No Fatality Accidents



BROOKS (U.S. 93) AND RESERVE STREET

Total of 20 Accidents for Period
13 Angle Accidents - Middle of Intersection
4 Rear End Collisions
3 Side Swipe
16 Occured During Daylight Hours

RESERVE STREET AND SOUTH THIRD STREET

Total of 6 Accidents for Period
3 Rear End Collisions
2 Angle Collisions
1 Fixed Object Collision
3 Daytime Accidents

RESERVE STREET AND SPURGIN ROAD

Total of 24 Accidents for Period
10 Injury Accidents With 17 Injuries
12 Angle Collisions
7 Rear End Collisions
3 Fixed Object - Single Vehicle Collisions
2 Bicycle Related Accidents
19 Daytime Accidents

RESERVE STREET AND SOUTH AVENUE

Total of 28 Accidents for Period
17 Rear End Collisions
7 Angle Collisions in Intersection
23 Daytime Accidents

FIGURE 14

ACCIDENT LOCATIONS

(Oct. 1, 1980 Through Sept. 30, 1983)

and therefore are not reflected in Table No. 9; however, these accidents were included in this discussion because they were considered pertinent.

Circumstances regarding the causes of each accident are generally unrelated; however, three of the five accidents which occurred since 1980 involved young pedestrians or bicyclists. It is interesting to note that two of the accidents occurred during the late evening or at night and only one accident may be attributed to icy road conditions. Since separate walkway/bikeway facilities are lacking along much of this section of Reserve Street, both pedestrians and bicyclists must share the roadway with motor vehicles.

TABLE NO. 11

PEDESTRIAN/BICYCLE ACCIDENTS

January, 1980 through September, 1983

	Date	Time	Location	Accident Description
*	6/13/80	11:30 pm	Reserve Street & Olofson Drive	10-year-old boy darted across Reserve St., southbound vehicle struck child resulting in incapacitating injury.
*	8/17/80	4:20 pm	Reserve Street & S. Seventh St.	12-year-old boy was southbound on Reserve Street, crossed intersection when eastbound vehicle struck rear wheel of bicycle. No injury resulted.
	12/7/82	7:10 pm	Reserve Street & Old U.S. 93	Two westbound motor vehicles on old U.S. 93 collided as one vehicle attempted to avoid striking a pedestrian. No injuries resulted.
	3/5/83	12:40 pm	Reserve Street between McDonald & Dixon Avenues	12-year-old male bicyclist and a motor vehicle were both southbound on Reserve Street, when the bicyclist turned left in front of the vehicle. No injuries resulted.
	7/4/83	9:35 pm	Reserve Street & Central Avenue	16-year-old male bicyclist was southbound on Reserve Street and struck a westbound motor vehicle on Central Avenue. Resulted in evidence of injury to bicyclist.

* These accidents are not reflected in Table No. 9 due to the fact that they occurred prior to October 1980, but were considered pertinent to the discussion in this section.

E. CULTURAL, RECREATIONAL, AND VISUAL ENVIRONMENT

1. HISTORICAL & ARCHAEOLOGICAL

a. Historical Background

Prior to the early 1800's, the Missoula Valley was wilderness inhabited by Indians of the Salish Tribal Nation. The earliest record of white man in the Missoula Valley occurred in 1805 and 1806 when members of the Lewis and Clark expedition encountered the Salish Indians along Grant and Rattlesnake Creeks. Following this initial contact with the Salish, few white men entered the area until trapping and fur trading activities began in the 1830's and 1840's. This period is also marked by the establishments of Catholic missions in the Indian Territory by Father De Smet and Father Ravalli. By 1853, the Missoula Valley ceased to be part of Oregon Territory and became part of the newly created Washington Territory. Expeditions from military outposts in Washington Territory pushed into the area and the need for improved access to the eastern portion of the Territory was viewed as essential. A portion of a military road extending from Fort Walla Walla to Fort Benton was constructed through the Missoula Valley by 1860. This roadway which spurred development in the valley area, was named after the leader of the military road building crew and is still locally known as "Mullan Road".

Settlement in the Missoula Valley initially began around a trading post established in 1860 by Francis Worden and Christopher Higgins. A small community known as Hellgate sprang up around the post and flourished for several years. Another community developed about four miles east of Hellgate around a sawmill and flour mill owned by the Missoula Mills Company. This community, which became the present-day Missoula, grew much faster than Hellgate and by 1866 had become the county seat. Fort Missoula was constructed during the late 1870's and by the early 1880's, facilities at the fort included quarters for officers and non-commissioned officers, barracks, married men's quarters, a hospital and dead house, a chapel, a school, a guardhouse, and numerous storehouses and accessory buildings. It is interesting to note that the impetus for early settlement of the Missoula Valley was rich farmlands and timberlands rather than mining as in many areas of western Montana.

The Missoula community continued to grow and change as the railroads entered the valley. The Northern Pacific Railroad was built in 1883 and by 1889 a branch line extending into the Bitterroot Valley was completed. Development spurred by the railroad allowed Missoula to become an incorporated city by 1885. The Milwaukee, St. Paul and Pacific Railroad reached the community in 1906 and provided access to the west for

prospective homesteaders. The University of Montana, which was founded in 1895, was also responsible for development of present-day Missoula.

b. Archaeological & Historical Data

In order to assure compliance with Federal historic preservation regulations (Section 106 of the National Historic Preservation Act and Executive Order 11593), the Montana Historic Preservation Officer and the Montana Department of Highways' Anthropologist were consulted to determine whether any cultural resources are located within the project study area.

The Fort Missoula Historic District, a property eligible for inclusion in the National Register of Historic Places, is located approximately one-half mile west of the Reserve Street area. Rock gateposts, which mark the original entrance to the Fort Missoula complex, are located at the corner of South Avenue and Reserve Street. These gateposts have previously been moved from their original position; therefore, no further cultural compliance actions are required.[40, 41] Consequently, the proposed project will have no effect on the historic and cultural properties of the project study area.[42]

2. RECREATION

Recreational opportunities for residents of the Reserve Street area are offered at two primary locations within the study area. These areas include Fort Missoula, which has been designated as a district park, and the C.S. Porter School.[43] The Fort Missoula district park complex includes the area west of Reserve Street and extends from South Avenue to old U.S. Highway 93. Active recreation areas in this complex include two golf courses, the Missoula Country Club and Larchmont Municipal Golf Course, and the Missoula Batting Cages and associated playground and playfield facilities. A historic park, picnicking areas, and natural trails are in various stages of development. Fort Missoula's designation as a district park implies that the area serves a large portion of Missoula's residents.

C.S. Porter School, located just west of Reserve Street and between Central and North Avenues, offers limited recreational opportunities to residents of the Reserve Street area. Playground facilities at the school are primarily used by students during school hours and during free-time periods. The Missoula County Parks, Recreation and Open Space

Plan cited a lack of recreational facilities for the C.S. Porter neighborhood and estimated that an additional 2.1 acres of parkland is necessary to adequately serve residents of the area.

3. VISUAL RESOURCES

The visual character of the project study area is directly affected by the moderately developed commercial and residential areas along the roadway. This development has limited the visual resources of the study area, primarily to views of distant mountain and foothill landscapes. Unrestricted views of these landscapes are possible from several locations along the travel corridor; however, development and roadside vegetation along most of the route restrict such views. Larchmont Municipal Golf Course and several areas of open pasture and agricultural land afford motorists views of foreground scenes as a contrast to distant views.

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PART IV: ENVIRONMENTAL CONSEQUENCES

PART IV: ENVIRONMENTAL CONSEQUENCES

A. INTRODUCTION

Using the existing conditions summarized in the preceding chapter as a baseline, the impacts for each of the roadway alternatives proposed have been projected and evaluated. Potential impacts were assessed according to the categories previously discussed. The comparison of the potential impacts for each alternative roadway design provides an objective means by which the alternatives can be evaluated and a preferred alternative selected.

It should be recognized that the projection of potential environmental impacts is a process with inherent limitations. Where possible, empirical and/or mathematical models have been used to quantify impacts. This is generally the case with direct impacts of the proposed roadway since such impacts are usually more apparent. However, indirect or secondary impacts (impacts related to factors other than the construction and the physical presence of the roadway such as secondary growth due to roadway improvements, land use changes, etc.) are often less obvious and more difficult to assess. Where possible, these secondary impacts have been quantified and/or discussed in descriptive terms.

B. PHYSICAL ENVIRONMENT

1. GEOLOGY AND SOILS

The subsurface geologic materials encountered in the area of the proposed project consist of two types of alluvial materials which differ somewhat in both age and composition. Older alluvial materials, consisting of reworked silt and unconsolidated sand and gravels are likely to be encountered during subsurface excavations between U.S. 93 and South Seventh Street. More recently deposited alluvial materials, consisting of poorly sorted and unconsolidated silts, sand and gravels, would be encountered north of South Seventh Street, where the topography change from an old river terrace to a more recent floodplain of the Clark Fork River.

The characteristics of these subsurface materials in the project study area are well suited for roadway construction. These course-grained materials have a low sensitivity to vibrations allowing the material to maintain its strength through years of heavy traffic usage. These alluvial materials also have a low compressibility which indicates that excessive settlement of the roadway base is not likely to occur. Any material encountered during construction should be easily excavated and would serve as suitable fill material. The unconsolidated nature of these materials also results in a highly erodable material and care must be taken to avoid erosion in area where the material is subject to surface water runoff.

The surface materials likely to be encountered during the construction were formed from the alluvial parent materials which underly the study area. These materials determine many of the physical and chemical characteristics of the soils and are useful in predicting the limitations of the soil. The soils in the reserve Street area are well drained to excessively drained and should present only slight limitations to road building activities. It is likely that much of the surface material will be excavated and replaced with a formulated base material of a uniform character to enhance the durability of the new roadway. Topography in the project area will not require any major road cuts thereby limiting the potential for surface erosion and subsequent damage to the surrounding environment.

The impacts on the geology and soils of the proposed project area would be similar for all improvement alternatives; however, the extent of this impact varies somewhat by alternative. Each improvement alternative employs similar design considerations but construction quantities (i.e.

cuts, fills, grades, etc.) would differ for each roadway width. Obviously, the quantity of excavation required for four-lane alternatives. These impacts on geology and soils are common to any roadway construction project.

The original roadway was constructed in 1955 and has withstood nearly thirty years of traffic without major reconstruction activities. Since the alignment for all of the improvement alternatives is similar to that of the existing roadway, no unusual problems are anticipated. All construction alternatives would include the installation of curbs, gutters and storm drainage facilities. These drainage facilities would have a beneficial impact on the project study area by minimizing the potential for surface erosion and sedimentation adjacent to the roadway. Impacts on the geology and soils of the project area are therefore considered minimal for all alternatives.

2. WATER RESOURCES AND QUALITY

Impacts to water resources and quality primarily involve the potential water pollution associated with stormwater runoff. The drainage of the highway structure coupled with accumulated pollutants from the roadway and right-of-way, provide the mechanism by which pollution of surface or groundwaters can occur.

In conjunction with the various roadway alternatives proposed for Reserve Street, two drainage systems are proposed, each using a combination of piped inlets and seepage pits. The north system would drain the corridor from South Seventh Street north, and connect to existing piped drains converging near the old Milwaukee Railroad right-of-way and emptying to the Clark Fork River west of there. The south system would drain the corridor from Spurgin Road south and would tie to the existing drainage system on U.S. 93. Each system, as proposed, would use pairs of inlets at approximately one-block intervals along the corridor, with each inlet doubling as a seepage pit and the westerly inlets also doubling as manholes. With the exception of two isolated seepage pits between the north and south systems, the pits (inlets) would overflow to piped trunk lines. No additional provisions for detention or treatment facilities are planned on the existing storm drain systems to which the new Reserve Street facilities tie.

Secondarily with respect to water resources, impacts to water-related utilities and services due to construction or alteration of the corridor may be of concern. Such impacts could involve changes in available services or limitations on future maintenance and expansion.

a. Surface Waters

With respect to stormwater runoff, modeling techniques have been developed for predicting the types and concentrations of pollutants generated by functioning highways. One of the models currently available was published by FHWA in February, 1981.[1] This model was used to predict pollutant generation and surface water quality impacts for the proposed Reserve Street alternatives .

Route length, shoulder design (e.g., curbed or uncurbed), and average daily traffic (ADT) are the primary input parameters for the model. Roadway width and number of lanes do not significantly affect the pollutant load generated by the roadway.[2] Since the roadway alternatives all have similar shoulder types and comparable traffic volumes, The FHWA model indicates that resulting pollutant loads for the alternatives will be essentially the same. The primary pollutant contained in urban and highway runoff is total solids, a sizable fraction of which becomes suspended solids in water. Associated with these total solids are nutrients, heavy metals and organic compounds.

To evaluate a worst-case situation with respect to pollutants generated by the roadway alternatives, the following approach was used. From hydrogeologic records the 100-year, 6-hour storm event was selected as a source of runoff far exceeding the normal occurrence. A 20-day dry period was assumed preceding the storm. Pollutants deposited along the 2.1-mile corridor during this period were quantified and presumed to all discharge to each of the nearby rivers. The results of this idealization are presented in Table No. 12 for both the Clark Fork and Bitterroot Rivers, and the pollutant concentrations contributed are compared to background and allowable concentrations. As the predicted concentrations indicated, no discernible degradation of either stream would occur even under this conservative situation. In reality the pollutant contributions to these rivers would be substantially less than shown in Table No. 12 for several reasons: 1) the washoff of pollutants accumulated along the corridor would be less than the total generation; 2) some absorption of pollutants would occur in soil and vegetation prior to runoff reaching either river; 3) the pollutant generation of the entire 2.1-mile corridor would be distributed between the two rivers rather than being delivered directly to only one, hence dilution would be greater; and 4) percolation of runoff to the soil naturally and through seepage structures would reduce volumes reaching the rivers.

A similar comparison was made on an annual basis. The entire pollutant load generated along the corridor in the course of a full year was assumed to discharge to the Clark Fork and Bitterroot Rivers individually. Numerically, the results of this analysis showed even less affect than the 100-year, 6-hour storm event.

TABLE NO. 12

PREDICTED MAXIMUM POLLUTANT LOADS TO
CLARK FORK AND BITTERROOT RIVERS

Pollutant	Total Generation[1] (LBS)	Clark Fork River Potential Contrib.[2] (MG/L)	Clark Fork River Concen.[3] (MG/L)	Bitterroot River Potential Contrib.[4] (MG/L)	Bitterroot River Concen.[3] (MG/L)	MDHES Concen.[5] (MG/L)
Total Solids	2,160	0.39	135[6]	0.78	--	--[7]
Suspended Solids	1,170	0.21	35[6]	0.42	--	25
Volatile Suspended Solids	340	0.06	--	0.12	--	--
Total Kjeldahl Nitrogen	13	0.002	0.71	0.005	0.20	0.35[8]
Total Organic Carbon	146	0.026	6.7	0.053	4.9	--
Biochemical Oxygen Demand	93	0.017	1.3	0.034	1.4	--[9]
Phosphate	4.5	0.0008	0.10	0.002	0.02-0.05	0.05
Iron	37	0.007	832	0.013	63-92	0.3
Lead	2.2	0.0004	20-50	0.001	5-50	5.0
Chromium	0.13	0.00002	0-6	0.00005	4.0	0.05
Copper	0.74	0.0001	30-94	0.0003	4-10	1.0
Cadmium	0.11	0.00002	0-5	0.00004	1.0	0.002
Mercury	0.01	0.000002	0.3	0.000004	0.1-0.2	0.002
Chloride	178	0.032	3.0	0.065	2.0	250
Zinc	1.4	0.0003	119-162	0.0005	10-15	5.0

1 Predicted generation based on FHWA Predictive Procedure (FHWA Report No. FHWA/RD-81/044) for an ADT of 22,000 vehicles between Brooks and Third Streets with twenty days since last "wash-off".

2 Contribution to the Clark Fork River is based on the assumption that all pollutants generated reach the Clark Fork where the average flow is 3,000 cfs.

3 Based on USGS and MDHES water quality data; characteristic values or ranges are shown.

4 Contribution to the Bitterroot River is based on the assumption that all pollutants generated reach the Bitterroot where the average flow is 1,500 cfs.

5 Based on 1979 Secondary Drinking Water Standards and revisions as referenced in MDHES "B-1 Water Quality Designation.

6 Concentration during periods of low flow.

7 U.S. Department of the Interior guideline to safeguard freshwater fisheries (no standard exists).

8 MDHES-suggested guideline for total inorganic nitrogen (no standard exists).

9 MDHES-suggested guideline for total phosphorous (no standard exists).

It is apparent that the runoff pollutant contribution from the roadway is so small that no adverse impact would be caused to the quality of the Clark Fork or Bitterroot Rivers or any other surface water resource in the area. The solids contributed by any roadway alternative would be negligible in comparison to the natural dilution. Nutrient contributions would also be insignificant and should have no discernible effect on the nutrient budgets of either river. Trace heavy metals would likewise cause no impact due to the minute concentrations involved.

In the past years, de-icing salt (sodium chloride) used on county maintained roads has averaged approximately 133 pounds per mile per winter, applied in combination with sand. This application is much less than usual salt applications used for snow and ice control typical of midwestern states. The salt is mixed with sand to soften snowpacked roadways and keep damp sand from freezing in application machinery. Based on this average salt application rate, approximately 300 pounds of de-icing salt is applied each winter on the Reserve Street project area. This average application is viewed as quite conservative for Reserve Street. Actual applications may be two to three times the county average due to the high traffic volumes and the additional maintenance required for this roadway.

Since sanding, and thus salt requirements, are directly related to the roadway surface area involved, the existing application could be expected to increase with increased highway widths. Conservatively assuming that 600 pounds per winter was discharged directly to the Bitterroot River and was diluted by the average annual flow thereof (similar to the comparison presented in Table No. 12), a rise in the ambient sodium and chloride concentrations of 0.006 mg/1 could be expected. This compares with existing ambient concentrations of 5.4 mg/1 dissolved sodium and 2.0 mg/1 chloride. A similar comparison in the Clark Fork River indicates comparatively greater dilution and slightly higher background concentrations. Such a conservative oversimplification obviously ignores many mitigating influences such as vegetative and soil attenuation of the salt load. "No effect" levels reported in the literature for salmonids and other cold-water biota are in excess of 1,000 mg/1. Threshold concentrations for human taste are reported to be anywhere from 200 to 900 mg/1. For cardiac patients, a limit of 10 mg/1 is recommended.[3] Recognizing the many-fold factor of safety involved, no adverse impact is possible. Obviously, a radical increase in roadway salting activity could alter the situation, but this would have to involve an increased salt application of many, many times greater than present policies.

Since washoff of pollutants occurs more thoroughly from roadway pavement than grassed roadsides, it can be assumed that a broader expanse of pavement has comparatively greater pollution potential. However, in view of the conservative assumptions of the preceding model analyses,

even the worst case situation would not result in adverse impacts. Thus, all of the alternatives can be considered as comparable in their generation of surface water pollution, and that the impact for all of the alternatives would be negligible.

The Federal Water Pollution Control Act authorized discharge permits for urban stormwater discharges. However, the State of Montana under its Montana Pollutant Discharge Elimination System has chosen not to implement the federally authorized permit system for such discharges, and no requirement for discharge permits for stormwater discharges is in effect in the state.[4] The MDHES Surface Water Quality Standards and associated B-1 classification for the receiving waters in the area could not and would not be violated. The MDHES has also published a set of guidelines for management of stormwater runoff.[5]

In conclusion the runoff generated along the corridor could be discharged directly to adjacent water courses, such as the Clark Fork and the Bitterroot Rivers, without violation of existing water quality standards or adverse impact. This is due to the small size of the catchment areas involved and the correspondingly low flows and pollutant loads generated.

b. Groundwater

The greatest potential for adverse impacts to the groundwater from any given roadway alternative would exist with the percolation of polluted stormwater runoff. This should be successfully mitigated on several counts. The nature of the contaminants in runoff, as discussed in the preceding section "Surface Waters", is largely settleable and suspended solids, both of which are effectively removed by physical filtration. The graded sand and gravel content of the corridor soils is well suited to this sort of removal. The gravel and filter fabric base of the storm drain seepage pits also enhances filtration. The success of such filtration is attested by the regular cleaning and flushing these pits are known to require. Storm water discharges to groundwater are specifically exempt under the requirements of the Montana Groundwater Pollutant Discharge Elimination System.[6]

The 30-foot separation to groundwater also provides an excellent margin of safety, and results in a relatively long filtration path for percolating runoff. The majority of the predicted pollutants are associated with the suspended solids in the runoff, and it should be noted that trace heavy metals such as those typical of highway runoff are very effectively attenuated by the natural clay particles in the soil.[7]

Additional contingency against groundwater contamination by runoff is demonstrated by the number of similar stormwater seepage pits operating in Missoula County without any reported groundwater contamination. Literally thousands of them are in use in the area, with regular groundwater quality monitoring by Mountain Water Company, no evidence of such contamination has ever been detected.[8]

Due to the comparatively low salt applications used along the corridor, discernible adverse impacts to groundwater from runoff containing sodium chloride would not occur. Current modeling techniques for the influence to domestic wells from roadway salting indicate that even in a "worst-case" situation; i.e., a domestic well situated only 20 feet from the roadway where the entire 2.1-mile corridor drains toward the well and where groundwater is 30 feet from the ground surface, adverse effects are highly improbable.[9] It should be pointed out that the foregoing modeling technique has been empirically developed for dug, rather than drilled, wells. However, the model predicts the amount of salt reaching the groundwater table, and thus provides a good simulation of conditions in the field irrespective of the type of well involved. Other mitigating influences to prevent salt contamination of the groundwater in the study area such as vegetative and soil attenuation provide additional safeguards.

A secondary potential for adverse impacts to the groundwater would be from contamination of surface water providing aquifer recharge. The two major rivers in the area, and particularly the Clark Fork River, are known to provide substantial recharge to the groundwater underlying the entire Missoula area.[10] As documented in the preceding section "Surface Waters", no contamination of the surface waters of the area is expected, and therefore the groundwater would be similarly safeguarded. Although the additional groundwater recharge afforded by the storm drainage seepage pits would be a positive benefit, its magnitude is expected to be very slight. No significant positive groundwater impacts are anticipated in conjunction with the project.

Thus, no adverse impacts to groundwater as a result of runoff contamination are anticipated with any alternative under consideration.

c. Sanitary Sewers, Water Mains, and Storm Drainage

No adverse impacts to existing or proposed sanitary sewage facilities are anticipated with any of the alternatives under consideration. As discussed in Chapter III, the City of Missoula plans to install a new relief interceptor sewer along Reserve Street ahead of or during roadway construction if their budget allows. The existing 21-inch interceptor along the corridor will remain unaffected. Should the City not be able

to install the relief sewer ahead of road construction, the relief sewer would likely have to be located in the right-of-way outside the limits of the pavement. This would be somewhat more difficult and expensive with the wider pavement sections, due to limited remaining right-of-way space. However it would be possible in any case, and the economic difference is not appreciable. At the time of road construction the City also has definite plans to install the casings for existing and planned lateral sewer crossings to save the later cost of boring such crossings or disrupting large sections of pavement. The roadway alternatives under consideration would vary slightly in the lengths of casing required, but the economic impact of this difference is also minimal. The Reserve Street lift station has already been relocated and upgraded to accommodate street expansion and future sewage flows.

Water mains in the corridor will remain essentially unaffected by any of the alternate designs for Reserve Street. While the new pavement installed will be slight deterrent to maintenance excavation or installation of additional mains for water system expansion, the effect is not expected to be severe. Utility improvements typically include pavement removal and replacement or special construction at major road crossings. Current Montana Department of Highways policy would likely prohibit open cuts in Reserve Street, once reconstructed, except in the event of an emergency. A potential adverse impact that can be successfully mitigated during roadway design would be lessened freeze protection for water mains due to reduced earth cover in roadway cuts. The absence of appreciable cuts on the project coupled with some design foresight should prevent any problem in this regard.

While the existing Reserve Street corridor contains very limited storm drainage facilities, the proposed alternatives all include similar extensive systems. The better drainage associated with the alternatives can be viewed as a positive impact. By promoting better drainage in the corridor and making more complete use of adjacent drainage facilities to which the corridor system will tie, economic and aesthetic benefits are derived.

The existing Missoula Irrigation District canals that cross or parallel the corridor will not be adversely affected by any of the proposed alternatives. At crossings, new hydraulic structures will be provided as part of the roadway construction, and the parallel run of canal north of Strand Avenue is proposed to be reshaped and concrete-lined. In general such improvements are viewed as positive benefits. Water quality in the canals is not expected to be adversely impacted by the project. With comprehensive storm drain facilities proposed in conjunction with each of the roadway alternatives, capture of runoff water will be more thorough, and comparatively less should enter the canals than does under the existing conditions. In addition, the relatively low runoff

pollutant loads predicted for the corridor insure that water quality in the irrigation canals should not be adversely impacted.

3. AIR QUALITY

Missoula is currently a non-attainment area for both carbon monoxide and total suspended particulates for violation of federal primary pollution standards. The non-attainment boundaries for both CO and TSP are the city limits of Missoula. Currently, most of the length of Reserve Street being considered for reconstruction is outside the city limits and therefore outside the non-attainment boundary. The Missoula City-County Health Department has suggested that the non-attainment boundaries for TSP be extended to include a larger portion of Missoula County; the full length of Reserve Street would be included in this extended boundary.

Traffic facilities such as roadways or parking lots are considered indirect sources of air pollutants in that the facilities themselves do not generate pollutants but they attract sources of pollutants, which in this case are automobiles and trucks.

Because Reserve Street as a traffic facility and indirect source of pollutants already exists, an appropriate means for evaluating the air quality impacts of reconstruction of Reserve Street is to assess the existing facility and compare the proposed alternatives to this existing facility.

The direct impact of any of the "build" alternatives on the air quality along Reserve Street would be a reduction of the amount of total suspended particulates re-entrained along the road, assuming reasonable maintenance, similar traffic volumes, and a decrease in the concentrations of carbon monoxide along the roadway. The decrease in TSP will be due primarily to the decrease in the natural dust load resulting from paved shoulders with curbs and gutters; the decrease in CO will be due primarily to increased average vehicle speeds. Average vehicle speeds are increased through the reduction of vehicle stops and delays.

An indirect benefit of any of the build alternatives would be the provision of a more desirable alternate traffic route around Missoula. This more desirable route will remove some of the through-town traffic on U.S. 93 and thereby reduce TSP re-entrainment and CO emissions in the Missoula central city area where the concentrations of these pollutants have been shown to be of the greatest magnitude in the Missoula Valley.

a. Total Suspended Particulates

Although vehicles do emit some particulates via exhaust, the most important means of generation of particulates by vehicles is in the re-entrainment in the air of fugitive dust from along the roadway as vehicles pass.

An equation to evaluate a length of roadway as a source of particulate emissions was empirically developed for the Montana State Air Quality Bureau by the Midwest Research Institute.[11] The emission factor equation in terms of pounds of particulate generated over the length of the roadway is as follows:

$$0.45\ (4/N)(S/10)(L/5{,}000)(W/3)^{0.8}V \cdot M$$

where:

S = Silt content of road surface material (%)
N = Number of travel lanes
W = Vehicle weight (tons)
L = Surface dust loading on traveled portion of road (lbs/mi.)
V = Number of vehicles on the roadway
M = Length of roadway (miles)

Sampling along Reserve Street during 1979 yielded material loading (L) of 126.9 lbs/mi. with a silt content of 24.5 percent.[12] Similar loading can be currently expected. Using current traffic volumes and an average vehicle weight of three tons, Reserve Street presently contributes 1,579 pounds per day of particulates.

$$0.45\ (4/2)(24.5/10)(126.9/5{,}000)(3/3)^{.8}(13{,}500)(2.09) = 1{,}579$$

The concentration of these particulates will depend on the daily meteorological dispersion characteristics along Reserve Street. Assuming similar loading, the source evaluation equation shows that the amount of particulates generated is directly related to the traffic volume.

One of the most significant determinants of the amount of particulates generated from a section of roadway is the roadway design. The source evaluation equation shows an inverse relationship between particulate generation and the number of travel lanes. Assuming similar dust loading per unit area of travelled roadway, an equal surface area of travelled roadway per travel lane and equal traffic volumes, the source evaluation equation indicates that roadways with additional travel lanes will generate the same amount of particulates as a two-lane roadway. Extra lanes also reduce the amount of re-entrainment or carryout of fugitive dust from sources adjacent to the roadway.

Curbs, gutters and paved shoulders restrict the carryout by vehicles of fugitive dust from adjacent sources. In addition, curbs and gutters provide a mechanism for collecting dust which can then be removed from the roadway by street sweeping or flushing.

All of the streets intersecting Reserve Street between U.S. 93 and South Third Street are paved. Paving of cross streets has reduced the carryout of fugitive dust onto Reserve Street; however, several alleys, driveways and parking lots along Reserve Street are not paved. Wider paved shoulders and proper curbs would reduce the amount of carryout from these sources.

Maintenance practices also determine the amount and types of surface dust loading along a road. The type and quantity of sanding materials used during the winter months greatly affect the amount of loading and the silt content of the dust. Regular and appropriate street sweeping and flushing reduce loading.

Using the source evaluation equation as a basis for analysis, each of the alternatives, including the no-build alternatives, would generate the same amount of particulates assuming similar surface dust loading per unit area of travelled roadway and traffic volumes. However, wider paved shoulders with curbs and gutters would significantly reduce the carryout of fugitive dust to the traffic lanes from adjacent sources. Assuming that the dust load per unit area which is applied for maintenance purposes would be the same for all alternatives, the dust load originating from natural sources will be significantly lower for all of the alternatives with paved shoulders. In addition, curbs and gutters for each of these alternatives would provide a mechanism for collection of dust and would facilitate its removal. The no-build alternative would have a more adverse impact on the air quality of the Missoula Valley than the other alternatives because of the presence of a larger quantity of naturally generated dust and the absence of a convenient and effective mechanism for the removal of such materials.

The build alternatives would all generate approximately the same amount of total suspended particulates. Any increase in TSP generation along the route as a result of increased traffic volume shall be directly proportional to the increase. The decrease in TSP generation along alternative routes, such as through the Missoula central city, would be directly proportional to the number of operators choosing Reserve Street over these routes.

b. Carbon Monoxide

Vehicle exhaust emissions along with residential wood burning are the two major sources of carbon monoxide in the Missoula Valley. The high-

est concentrations of exhaust emission-generated carbon monoxide in the Missoula Valley is found at the six-way intersection of Brooks, South, and Russell Streets. This is the only location in the Missoula Valley where exhaust emissions are the primary cause for violation of the federal CO standards.

When evaluating the impact on air quality of an indirect source such as Reserve Street, it is necessary to consider the sum of the potential air pollution generated by the indirect cause and the background concentrations at the upwind edge of the source. It is necessary to determine whether this sum will violate the one-hour (35 ppm CO) or eight-hour (9 ppm CO) standards. Generally, source-specific contributions will dominate the total CO concentrations for the worst one-hour case while the worst eight-hour cases are frequently dominated by high background concentrations of CO. Short-term, source-specific contributions are particularly evident during the morning and evening traffic peaks. Relatively low housing densities in the Reserve Street area, with resultant low levels of residential wood burning, result in a lower background CO concentration than in other areas around Missoula.[12] Because of this lower background concentration, increased traffic will have a smaller impact in terms of violation of federal air quality standards than a similar increase in the central city area.

The CALINE3 pollutant dispersion model was used to estimate and compare the CO impacts of each of the alternatives and examine the existing situation.[13] The network description and traffic demand volume are used to estimate the traffic flow characteristics, and emissions are calculated. Data requirements include road width, design speed, percentage of heavy-duty vehicles (including diesel trucks), diurnal traffic patterns, type of intersection control, and yearly surface and upper air meteorological data.

Emissions for an extended section of roadway are considered uniform and are computed on the basis of vehicle speed and volume. Emissions at intersections are the sum of those produced from non-stopping vehicles and those emitted over a finite length of time by stopping vehicles. In general, for the same traffic volume, greater flow rates generate less carbon monoxide.

Emissions for the current year and the design year were interpolated and extrapolated from factors given in Mobile Source Emission Factors.[14] Pollutant emission reductions are expected to occur by the year 2000 in all important transportation-related pollutant categories, with carbon monoxide expected to show the greatest decrease. Representative meteorological information was taken from the Missoula Valley Dispersion Study.[15]

Currently, the most congested areas along Reserve Street are the intersections of South and Reserve, and South Third and Reserve. This congestion is due to lower intersection capacity. When the intersection capacity is exceeded, excessive queuing and traffic delays occur; this results in an increase in the amount of carbon monoxide generated at the intersection.

Currently the speed limit along Reserve Street is posted at 35 mph. However, during peak periods the traffic along the Reserve Street corridor travels significantly slower than this speed limit, particularly when excessive queuing occurs at intersections. Increasing the capacity of the roadway and the intersections would increase the traffic flow rate and decrease the amount of carbon monoxide generated.

For the CALINE3 model, receptors were positioned at important locations along the Reserve Street project area, including the more densely populated residential areas, and at the C.S. Porter School. For all of the alternatives, the model showed a decrease in the CO concentrations for the design year 2005 when compared to the current year. For the "no build" alternative, this decrease is attributable solely to the expected decrease in the amount of CO generated by newer vehicles over the next 20 years.[14]

Assuming a worst-case background concentration of 5 ppm CO, which was approximately the highest concentration shown at the six-way intersection during January, 1982,[16] one-hour and eight-hour federal standards were not exceeded at any of the modelled receptor positions along the Reserve Street traffic corridor for any of the alternatives during the design year. The Reserve Street model, however, does not take into account excess CO emissions for periods of traffic delays and excess queuing; in the event of these occurrences, carbon monoxide concentrations at intersections could be significantly higher.

Each of the build alternatives shows lower CO concentrations for all modelled receptor locations than the no-build alternative. This is due to the fact that Alternatives 1 through 4 increase the average vehicle speed through a reduction in vehicle stops and delays, which decreases carbon monoxide concentrations. Generally, the change in CO concentrations is inversely related to the average vehicle speed; i.e., an increase in average vehicle speed will decrease CO concentrations and a decrease in average vehicle speed will result in an increase in CO concentrations. In addition, the three- and four-lane alternatives provide a larger mixing volume, which yields a decrease in the CO concentrations.

Due to increased average vehicle speeds and a larger mixing volume, the four-lane alternatives show lower CO concentrations than the three- and two-lane alternatives, and the three-lane alternative shows lower

concentrations than the two-lane alternative. The four-lane alternatives show effectively the same CO concentrations at the modelled receptor sites along the traffic corridor.

This project is in an air quality nonattainment area which has transportation control measures in the State Implementation Plan (SIP) which has been submitted to the Environmental Protection Agency for approval. Approval of the SIP is expected during 1984. The FHWA has determined that both the transportation plan and the transportation improvement program conform to the SIP. The Federal Highway Administration has determined that this project is included in the transportation improvement program for the Missoula urban area. Therefore, pursuant to 23 CFR 770, this project conforms to the SIP.

4. NOISE

The noise level impacts are established by comparing existing and projected noise levels with the FHWA design noise levels. In order to determine the impact that the proposed project would have on noise levels the computerized FHWA Highway Traffic Prediction Model SNAP 1.0 (Simplified Noise Analysis Program) was used. The noise levels generated by traffic at the design hourly traffic volume (30th highest hourly volume) for both present conditions and the design year (2005) are shown in Table No. 13. For the purposes of this analysis, noise levels generated by the existing two-lane facility and the 74 foot four-lane alternative have been calculated and presented in Table No. 13. No projections were made for those sites where indoor tests were taken due to the limitations of the computer model to assess the noise reduction potential of the different types of residential structures.

TABLE NO. 13

PREDICTED NOISE LEVELS (dBA)
(30TH HIGHEST HOURLY TRAFFIC VOLUME)

Site No.	Direction from Centerline	Present Condition Existing Two-Lane	Present Condition 74' Four-Lane	Design Year (2005) Existing Two-Lane	Design Year (2005) 74' Four-Lane
1≠	East	--	--	--	--
2	East	70	69	73	71
3	East	72	71	74	73
4	West	70	70	72	73
5	West	68	68	71	71
6	East	68	66	69	69
7	West	67	68	70	70
8*	West	--	--	--	--
9	West	75	**	78	**
10	West	71	72	73	74
11≠	West	--	--	--	--
12	West	66	66	68	69
13*	West	--	--	--	--
14	West	71	**	73	**
15	West	70	70	72	73
16	West	66	66	67	69
17	West	68	69	71	71
18	East	70	64	72	71
19*	East	--	--	--	--
20	West	66	66	68	68
21*	East	--	--	--	--
22	East	68	67	71	69
23	East	71	69	73	72
24*	East	--	--	--	--
25	West	67	**	70	**
26	West	64	66	66	69
27	West	60	62	62	65
28	East	69	67	70	69
29	East	69	67	71	70
30	East	67	66	69	69
31	East	66	65	69	68
32*	East	--	--	--	--
33	West	--	--	--	--
34	West	68	68	71	71
35*	West	--	--	--	--
36	East	70	68	72	71
37	East	68	66	70	69
38	East	63	62	65	64
39	West	71	**	74	**
40	East	70	68	72	71

≠ Invalid test - no predictions calculated.
* Noise test taken inside - no predictions calculated.
** Test site too close to generator for model to predict.

It should be noted in the interpretation of the data presented in Table No. 13 that no projections were made for those test sites where the tests were interrupted and, therefore, invalid or at those locations where the noise tests were taken indoors. At four test sites no projection was possible for the four-lane alternative due to the fact that when considering the four-lane option the test site is too close to the traffic generator for the model to make an accurate projection.

According to the data, the noise levels along Reserve Street will increase by approximately 2-3 dBA during the design life of the facility. It is also evident that there is only a small difference (2-3 dBA) in the noise levels between the two-lane no-build alternative and the 74' four-lane option. Considering the difference in the projections for the existing two-lane and the 74' four-lane, it becomes obvious that the relative difference between all five of the build alternatives is so small that it is not discernible. It should be noted that any of the build alternatives will reduce the noise levels encountered on the east side of the facility by 2-3 dBA due to the shifting of the roadway centerline towards the west. Of course, the noise levels on the west side of Reserve Street will be increased by a similar amount (2-3 dBA) for the same reason.

Under present conditions, approximately one-fourth of the locations tested exceed the maximum noise level (70 dBA) recommended by the Federal Highways Administration for residential areas (includes schools, churches, playgrounds, etc.). Given the no-build option, approximately half of the tested locations will exceed the standards by the year 2005. Of course, it should be noted that the noise level is related to the distance to the sound generator. According to the research performed for this analysis, if the no-build option is selected, any location in excess of 100 feet from the existing roadway centerline on either side of the road will not exceed the FHWA recommended limits. If any of the build alternatives are selected, the set back distance becomes 100 feet for the east side and approximately 150 feet on the west side as measured from the existing roadway centerline. It should also be noted that none of the commercial areas will exceed the noise limits in the design year.

Under present conditions, the noise levels recorded inside most of the residences along Reserve Street are within the recommended FHWA maximum limits (55 dBA) anticipated. During the design life of the facility, it is assumed that only a small increase (less than 1dBA) in the noise level will occur inside the residential units along the corridor.

5. FLOOD PLAINS

Based on the investigations conducted for this report, it was determined that the project area is not located within the identified 100-year floodplains of either the Clark Fork or Bitterroot Rivers. Since this project is merely upgrading a section of the existing street network within the Missoula Urban Area and includes no floodplain encroachment, the proposed project will not have any direct effects on the floodplains of the Missoula area.

C. BIOLOGICAL ENVIRONMENT

1. VEGETATION

There will be significant impacts to vegetation within the strip of additional right-of-way required for construction of this project. The trees, shrubs, lawns and gardens which presently occupy this area will be removed during construction of any of the build alternatives. Several large and well developed spruce trees will be lost as a result of construction activity on the new right-of-way between South Seventh and South Third Streets. The loss of this vegetation resource will adversely affect the visual quality of the study area.The two- and three-lane alternatives would occupy less of the required right-of-way and would require less revegetation than the wider four-lane alternatives. Although, there are slight differences between the alternatives, these differences are considered minor in view of the urban nature of the area. Any loss in vegetation will be mitigated by revegetation of disturbed areas. The impact to the vegetation of the project area is therefore considered significant, but unavoidable.

2. FISH AND WILDLIFE

Lands adjacent to the Reserve Street project area have been developed for residential and commercial purposes. The extent of this development is variable over the length of the project and the least developed areas offer the greatest diversity in wildlife habitats. However, the areas to be directly affected by roadway construction provide very limited wildlife habitat and wildlife potential. The impacts to fish and wildlife within the project area are expected to be minimal. Although, the bald eagle and peregrine falcon have been listed as migrant species within the study area by the U.S. Fish and Wildlife Service, further consultations with the Agency and the Montana Department of Fish, Wildlife and

Parks have indicated that the proposed project will not affect the habitat of either species. Letters of concurrence from each agency regarding this assessment are contained in Appendix B. This concurrence complies with the requirements of Section 7(c) of the Endangered Species Act and concludes the consultation process.

D. HUMAN ENVIRONMENT

1. SOCIO-ECONOMICS

a. Population

Improvements under any of the project alternatives are not expected to notably affect the area's population. Current population projections for Census Tracts 8, 9 and 10 are for a 22 percent increase by the year 2000. Applying this rate of increase to the present study area population of 2,527 yields an additional 503 residents, or a total study area population of approximately 3,030 by the year 2000.

The eight mobile homes and twelve conventional single-family homes that would qualify for Relocation Assistance house approximately 47 people. In addition, four units owned by the Montana Department of Highways on a replacement parcel for C.S. Porter School would be removed; these units house approximately ten people. It is expected that at least some of these people would relocate to the rear of their parcels or elsewhere in the study area.

Traffic and noise levels are expected to discourage future single-family home development on the currently vacant land along Reserve Street. Any future population growth adjacent to the roadway is expected to be associated with multi-family housing projects, which are more compatible with a nearby major thoroughfare. The development permit system being implemented in the area by Missoula County is also likely to encourage development of higher-density planned unit development-type housing adjacent to Reserve Street.

The initial effect of housing relocations will be to temporarily decrease the number of persons living along Reserve Street. However, Reserve Street's population is likely to experience a net long-term increase as a result of future multi-family housing development. The remainder of the study area population will not be greatly affected by the project. Project development would generally improve the study area's transportation access to centers of activity throughout the Missoula area, and this could subtly increase the area's population. However, future Missoula

County and City land use, annexation and capital improvement policies and programs will have a greater influence on future settlement in the study area than any of the improvement alternatives discussed in this Environmental Impact Statement.

b. Housing

In addition to replacing the 24 units expected to be displaced by the project, the Missoula Planning Department estimates an additional 231 units would be needed to accommodate the study area's projected year 2000 population. A 1980 land use inventory conducted by the Missoula Planning Department showed that adequate land area was available for 710 units within the study area. As proposed, the right-of-way for this project will use approximately 185,000 square feet (4.2 acres) of privately owned land along Reserve Street. Future project right-of-way or housing relocations will not significantly diminish the land available to meet future housing needs in the project or study area.

Project development is not likely to change the mix of future housing development in the area. The Reserve Street corridor is already changing to a higher density-type residential area. By improving traffic flows, providing for more organized and safer roadway access, the Reserve Street project may serve to improve the quality of future multi-family residential development in the project area.

c. Land Use

Implementation of Reserve Street improvements it not expected to alter evolving land use trends along the roadway, although the project may have some influence on the precise location and some of the design characteristics of future uses.

The project area is currently in a transitional stage from a semi-rural residential area to a more urban mix of commercial and higher density residential land uses. The project area can be expected to continue to undergo increases in residential densities and commercial development, irrespective of proposed roadway improvements.

The proposed Reserve Street improvements may serve to accelerate the ongoing land use transition in the area. Improved traffic flow, reduced turning hazards, more controlled access and egress, and off-street parking requirements are likely to enhance the orderliness of future development along the roadway. Also contributing to more systematic development will be continued implementation of county land use policies for the area, which now provide for fairly strict site development standards.

d. Relocation Impacts

Proposed improvements would require 40 to 55 feet of additional right-of-way along the project corridor and minor amounts of right-of-way along several approaches at the Brooks Street, South Avenue and South Third Street intersectinos with Reserve Street. The Department of Highways has purchased two parcels for right-of-way purposes, and a third as replacement property for that portion of the C.S Porter schoolyard that would be taken for the project. In addition, a total of 24 dwellings and one seasonal business would be removed or relocated as a result of the project. Households within these units, with the exception of the four units owned by the Department, would be eligible for relocation assistance.[17] The Department's relocation program requires a 90-day notice to displacees and provides for moving expenses and replacement housing assistance resulting from project development.

Census data show that there are few minority or disadvantaged residents within the study area that would be affected by relocation. This was confirmed in an interview with Mike Kress, County Planner in October, 1983.

A review of available housing and rental and sales price information shows that there is adequate opportunity for replacement housing within the financial means of all displacees, both within the project area and in Missoula County. Although some of the area residents who have attended the meetings have expressed a desire to sell their properties and are anxious to leave the project area, there are others who may find it emotionally difficult to leave their residences. Although no one has expressed this sentiment to date, it is an unquantifiable impact that must be recognized.

Relocation of 24 households away from Reserve Street would have the effect of changing established neighborhoods along the roadway. Relocation is typically most difficult for older persons who have spent much of their lives residing in the same home, associating with the same group of neighbors.

For residents continuing to live along Reserve Street, both adjacent to the proposed project and elsewhere, road improvements would allow for greater traffic volumes, which might increase the current inconveniences of living along a major thoroughfare (noise, traffic conflicts, air pollution, etc.). These problems would likely be greatest in instances where improvements would cause the roadway traffic to be closer to homesites, and where part of a homesite's lawn area is removed. Project development would violate the county's minimum setback standards for approximately four structures. New setbacks would range from 15 to 25 feet from the proposed right-of-way.

Some of the ill effects caused by increased traffic volumes may be partially offset by the improvement of traffic flows on Reserve Street. More orderly travel is expected to reduce roadway accident rates, and may in some instances reduce noise and air pollution problems caused by frequent vehicle speed changes. Improvement in traffic flows are also likely to improve pedestrian safety along the roadway.

Some property owners have expressed concern over the adequacy of compensation that they will receive for property acquired by the state for project development. One landowner issue pertains to whether land should be valued as commercial or residential property. For other reasons, persons may also feel the amount of money offered by the state is not equivalent to the value of the residential property. The state does not provide compensation for such things as personal attachment to a home. If a landowner and the DOH do not reach mutual agreement regarding the adequacy of compensation, a condemnation proceeding will determine the compensation.

e. Economic Impacts

1) ECONOMIC BASE

The proposed improvements to Reserve Street will not have notable economic impacts on the Missoula area economy. The project will result in no significant increase or decrease in long-term employment opportunities for county residents. Only one business is likely to be displaced by the project, and it is expected to relocate within the urban area.

2) COMMERCIAL DEVELOPMENT

Proposed Reserve Street improvements would result in the displacement of one existing business, a seasonally operated fireworks stand. The owner of this business would receive a compensation payment to pay for relocating the business to another site. Other existing businesses along Reserve Street would be expected to remain in operation. Many of these businesses would benefit from improved traffic flows, which are likely to provide customers with more convenient and safer access and egress to and from their business locations.

Additional commercial businesses are likely to be attracted to Reserve Street irrespective of future road improvements. The roadway presently carries traffic levels similar to those occurring through existing major commercial areas of Missoula. All proposed Reserve Street improvement alternatives are projected to increase roadway traffic levels to some degree. Higher traffic levels and improved traffic flows may enhance the attractiveness of the project area to additional commercial development.

Expanded commercial business activity along Reserve Street would increase property incomes and business employment. Notably, business growth along Reserve Street would likely result in less commercial expansion, or may cause reductions in existing commercial activity levels elsewhere in the Missoula urban area.

3) LOCAL EMPLOYMENT AND INCOME

Commercial business expansion along Reserve Street would increase additional proprietor income and employment opportunities. Some local residents are likely to benefit directly from these opportunities. However, Reserve Street area employment and income growth is not anticipated to have an effect on overall employment and income in the Missoula urban area.

4) PROPERTY VALUES

The value of land along Reserve Street is expected to increase more rapidly than property values in the county in general, due to its potential for commercial and high-density residential development. Realtors who were familiar with the Reserve Street area agreed that improvement of the roadway would enhance property values, particularly if left-turn bays were provided and traffic was able to flow more smoothly. Appraisers for the Department of Highways explained, however, that if the existing area traffic and land use trends continue, single-family home values will decrease slightly while land values will increase, with or without the project.[18]

5) PROPERTY TAX REVENUES

Some residential and commercial property would be displaced by development of the Reserve Street project. Removal of structures and improvements, and conversion of privately owned land to public ownership would remove such real property from the Missoula area tax base.

Tax base and mill levy information was gathered from the Missoula County Appraiser's office. In Montana, taxable values are derived as percentages of market and appraised values of real property. State, local government, special district, and school district mill levies are applied to taxable values of property to determine the amount of tax payment due.

Factors complicating analysis of the tax revenue impacts resulting from removal of properties from the tax base are: real property along Reserve Street has not been appraised since the mid-1970's so the total current values would likely be somewhat greater than reflected by appraised values;[19] and fractions of many of the parcels would be affected by the project, thus only portions of a property's listed appraised value must be figured into the equation in determining loss of tax revenue. To improve estimates of possible effects on the area's tax base, County appraisal data was supplemented by Department of

Highways estimates of the current market values of potentially affected property. The Department prepared value estimates for total parcels and partial parcels anticipated to be acquired for project right-of-way.

The total market value of the affected properties and improvements is estimated at $1,268,180, exclusive of tax-exempt properties and the 4B's Restaurant and B & H Enterprises, which already abut adequate right-of-way. The taxable value of these areas is estimated to be approximately $108,429. Applying current mill levies, the total negative effect on the state, county, school district and special district tax revenues would be $3,397. Each taxing entity would annually lose the following taxes:

County	$ 686
State	194
School District	688
Missoula County High Schools	605
Health and Road	761
Transportation	216
Missoula Rural Fire District	247
Total:	$3,397

Tax revenue losses are expected to be short-term, since some relocated residents are expected to rebuild in the same tax district and new businesses are expected to locate along Reserve Street. In the long term, increases in commercial land uses and residential densities in the vicinity of Reserve Street are expected to result in a net increase in local property tax revenues.

2. TRANSPORTATION SYSTEMS

Improvement of this section of Reserve Street will complete the final segment of a major north-south connecting link for through traffic between Interstate 90 to the north and U.S. 93 to the south. Construction of this project will be consistent with transportation planning activities in Missoula and will help alleviate congestion on other routes in Missoula, principally on Brooks Street and at downtown intersections. All roadway construction alternatives will provide a safer, more efficient route for local residents to shopping, work places, and airport facilities. Documentation of these expected beneficial traffic impacts by alternative is included in subsequent sections regarding traffic capacity and traffic safety.

The public transportation system operated by the Missoula Urban Transportation District is expected to be favorably impacted by construction of any of the build alternatives. Representatives of the

District indicated that the narrow width of the existing Reserve Street facility was partially responsible for the lack of bus stops along the roadway.[20] Construction of any of the alternatives which incorporate ten-foot-wide shoulders into the roadway design would readily accommodate public bus service provided by the District. Alternative No. 2, which provides six-foot-wide shoulders, would be unable to accommodate the eight-foot wide buses used by the Mountain Line.[21] However, design modifications may be incorporated at a future date to facilitate bus stop installations along Reserve Street. This would allow public transportation to respond to the demands for such services as commercial development of the Reserve Street area occurs in the future.

3. TRAFFIC

The measure by which a particular highway fulfills its function of carrying traffic is determined by a capacity analysis, and by establishing the level of service at which the highway is operating. The capacity of a highway is defined as "the maximum number of vehicles per unit of time that can be handled by a particular roadway component under the prevailing conditions". This description and the analysis procedures used are from the Highway Capacity Manual.[22,23]

In order to function satisfactorily, a roadway must operate at a lower volume of traffic than when the facility is at capacity. The maximum number of vehicles that can be carried at any particular level of service is known as the service volume. Levels of service are designated from A through F (with A being the best and F the worst) to cover the full range of traffic operating conditions. These levels of service are described as follows:[22]

Level of Service A
A free-flowing condition with low volumes and high speeds. There are little or no restrictions to traffic and few delays.

Level of Service B
Stable flow with operating speeds beginning to show some restriction. Reductions in speeds may occur with a low probability of traffic flow being restricted.

Level of Service C
Still in the zone of stable flow with speeds and maneuverability more closely controlled by the higher volumes. Most drivers are restricted in their freedom to select their own speed, change lanes, or pass.

Level of Service D
Approaching unstable flow with tolerable operating speeds, although

considerably affected by changes in operating conditions. Drivers have little freedom to maneuver, and comfort and convenience are low.

Level of Service E

Represents operations at even lower speeds than Level D, with volumes at or near the capacity of the highway. Flows are unstable and there may be stoppages of momentary duration.

Level of Service F

Forced flow operation at low speeds where volumes are below capacity. Speeds are reduced substantially and stoppages may occur for short or long periods of time because of the downstream congestion.

Under urban conditions, the effectiveness of a highway is controlled by those intersections that create "bottlenecks" resulting in traffic delay and congestion. Along the Reserve Street corridor the effectiveness of the three signalized intersections will limit the overall service provided by the facility. The level of service for each of the signalized intersections (Brooks Street, South Avenue and South Third Street) was calculated using the procedures contained in the Highway Capacity Manual.[22] Three unsignalized intersections were included in the study to access the level of service for side street approaches to Reserve Street. These intersections were evaluated using methods outlined in a recent publication by the Transportation Research Board.[23]

The existing facility provides a relatively poor level of service under present traffic conditions. The three signalized intersections are operating at or near saturated flow conditions (Level of Service D/E), with the most notable delays occurring on the east approaches to the South Avenue and South Third Street intersections with Reserve Street. At the unsignalized intersections, side street access to the facility is limited by the availability of adequate gaps in traffic. Currently there are sufficient gaps to allow access with moderate to long delays (Level of Service D/E).

Geometric changes are required to produce an acceptable level of service (Level of Service C) at the three signalized intersections under year 2005 loadings. The required intersection geometrics are shown in Figures 3A and 3B. In order to handle the projected Reserve Street traffic volumes, the approaches to the signalized intersections must be widened to provide two through traffic lanes and exclusive left and right turn bays.

It should be noted that at the South Third Street intersection the east and west approaches must be widened to provide a two-lane approach with an exclusive left turn lane and a through/right turn lane. At this intersection the northbound traffic will be forced to merge into one lane on the northside of the intersection prior to crossing the bridge.

At the South Street intersection, the east and west approaches will require widening to accommodate a three-lane approach from the west and a four-lane approach from the east. The most notable change required at this intersection is that South Avenue must be converted to a four-lane facility at the intersection to facilitate the large number of vehicles exiting the intersection.

The intersection at Brooks Street must be altered to provide a four-lane approach on both the east and west approaches with a double left turn lane on the west approach. The south lane of the intersection will also need to be widened to accommodate three approach lanes. The section of Reserve Street between Brooks Street and Thirty-Ninth Street must provide southbound travel lanes to facilitate the large volumes of through traffic.

Two through lanes are required for all of the Reserve Street approaches to the signalized intersections. If the two- or three-lane alternatives were utilized, a merge condition would be required for through traffic on the opposite side of each signalized intersection to consolidate both through traffic lanes. The merge would create an unsafe condition and an additional "bottleneck" which would reduce the service level of the facility. In order for the signalized intersections to operate effectively, traffic must be able to exit the intersections without the interference created by congestion downstream in the traffic flow. Two continuous traffic lanes for each direction on Reserve Street would provide the necessary continuity for the entire facility. The relative difference in the level of service provided by any of the four-lane alternatives is minimal. Although the wider median and shoulder areas provided by some of the alternatives will help to further improve traffic flow characteristics, it is felt that the preferred alternative (74-foot wide roadway) will provide an acceptable level of service for the design year at a lower overall cost.

The implementation of the geometrics changes previously discussed will allow the three signalized intersections in this project to operate at an acceptable level of service (Level of Service C) in the design year 2005.

Based upon projections of design year traffic volumes, the side street approach traffic at the unsignalized intersections with Reserve Street will continue to experience difficulty entering the facility due to the lack of adequate gap availability. The side street traffic was evaluated using the two-, three- and four-lane alternatives for Reserve Street. The gaps in traffic required for access to a two- or three-lane facility are short and infrequent due to the single through traffic lanes. In the case of the four-lane facility, the necessary gap in traffic is longer due to the greater roadway width. Although the through traffic is shared by two through lanes, the necessary gaps in traffic will occur at

approximately the same frequency as expected for the two- and three-lane alternatives. Therefore, the side street approach volumes will operate at or near capacity regardless of the alternative selected for this Reserve Street project.

The traffic signal warrants were reviewed to determine if any of the presently unsignalized intersections will require signal control during the design life of the facility. Although access to the facility will be difficult from the side streets, it does not appear that additional signalization is warranted.

Associated levels of service are primarily affected by intersection capacity and the approach width, and therefore the wider road sections will obviously be able to accommodate a greater volume of traffic. The capacity analysis indicates that a single 12-foot through/right turn lane and a 12-foot left-turn bay, as provided in the 44-foot and 58-foot wide alternative, will not be able to adequately handle the design year traffic volumes at the major intersections. The four-lane alternative which included a 12 or 14-foot through-lane, a 12-foot through/right turn lane and a 12-foot left-turn bay will be able to provide an adequate level of service (Level of Service C or better) at all intersections along the corridor in the design year 2005.

4. TRAFFIC SAFETY

a. Accident Rates in Montana

Based upon the accident investigations conducted for this project, it was determined that the majority of all accidents which occurred on Reserve Street during the three-year study period were intersection-related. These accidents occurred at intersections with and without signalization and with and without traffic channelization such as left turn bays. In an effort to evaluate the relative safety of each alternative considered for the EIS, an investigation was conducted to determine the accident rates at comparable intersections within the urban areas of Montana. This specific intersection accident data was obtained through the Highway Information System Program (HIS) maintained by the Montana Department of Justice, Highway Traffic Safety Division.

The categories of intersections investigated included: Signalized intersections of two four-lane highways, both signalized and unsignalized four-lane by two-lane intersections, and signalized and unsignalized intersections of two two-lane highways. The intersections were selected from six major urban areas in Montana. Intersections were chosen that

would represent the approximate conditions of the project area based on traffic volume, geometrics and location within the urban area. Table No. 14 contains a summary of the accident rates for the various types of intersections analyzed.

TABLE NO. 14

ACCIDENT RATES BY TYPE OF INTERSECTION IN MONTANA

Type of Intersection	Number of Intersections Analyzed	Average Accident Rate (Per Million Vehicles Entering)
4-Lane x 4-Lane (signalized)	3	0.64
4-Lane x 2-Lane (signalized)	7	0.69
2-Lane x 2-Lane (signalized)	6	0.64
4-Lane x 2-Lane (no signals)	6	0.62
2-Lane x 2-Lane (no signals)	5	0.62

In the interpretation of the data in Table No. 14 it should be kept in mind that there are a limited number of intersections within the State of Montana that are available for comparison and that every intersection has unique characteristics that effect the accident rate. In each case the intersection was analyzed based on three years of accident data. The specific intersections that were used to develop the average accident rates and the corresponding calculations are on file at the Montana Department of Highways Office in Helena.

b. Estimated Accident Rates for Alternatives

Based on the information presented in Table No. 14 it is evident that the variation in accident rates for various types of well designed intersections is so slight that it is difficult to establish any discernible difference. It is anticipated that any variety of well designed intersection resulting from any of the build alternatives will result in lower overall intersection accident rates compared to those of the existing facility. An intersection accident rate of 0.6 ACC/MVE or less should be achievable regardless of the build alternative selected. This will result in a total reduction of approximately six accidents per year at the three signalized intersections, and nine accidents per year at the three major

nonsignalized intersections. Of course, the no-build alternative will most likely result in increasingly higher accident rates as the intersections approach capacity.

c. Pedestrian and Bicyclist Safety

Since 1980 there have been two pedestrian-related accidents and three bicycle-related accidents. At the present time pedestrians and bicyclists must share the roadway with motor vehicles. All of the build alternatives include sidewalks for the pedestrian traffic and paved shoulders for the bicyclist. Due to the lack of any facilities the present pedestrian and bicycle traffic volumes are relatively low. It is anticipated that if any of the build alternatives are implemented, the pedestrian and bicyclist traffic will increase; however, separation of the roadway and pedestrian facilities is not warranted. Considering the fact that all of the build alternatives include facilities for the non-vehicular traffic, the safety of pedestrians and bicyclists should improve despite the increased usage. Additional safety provisions for pedestrians and bicyclists, such as crossing signals or warning lights, would be installed in the future if warranted.

E. CULTURAL, RECREATIONAL AND VISUAL ENVIRONMENT

1. ARCHAEOLOGICAL AND HISTORICAL

Investigations regarding the cultural resources of the project study area indicated that no anticipated sites of historical or cultural significance will be affected by the construction of any of the roadway alternative. Since construction will not disturb any previously undisturbed ground or structures predating World War II, the Montana Historical Society, Historic Preservation Office issued a "Determination of No Effect" statement for the project. Documents regarding this determination are on file with the Montana Department of Highways in Helena.[24,25]

In the event that significant properties are discovered during construction, the Montana Department of Highways Standard Specifications for Road and Bridge Construction provides that "When any contractor's operation encounters remains of prehistoric peoples dwelling sites or artifacts of historical or archaeological significance, the operation will be temporarily discontinued until notified by the Engineer to resume work. The Engineer will contact archaeological authorities to determine the disposition thereof." This policy should provide adequate protection to all unanticipated cultural resources discovered during construction activities.

2. RECREATIONAL

The build alternatives would provide access improvements to the recreation sites west of Reserve Street through a safer roadway design. For all build alternatives, provisions will be incorporated into the roadway design to accommodate turns at the intersections with streets leading to the two golf courses and the Fort Missoula complex. Users of Larchmont Municipal Golf Course will experience some increase in noise levels along the portion of the course adjacent to the proposed roadway.

Property taken from public recreation areas funded under the Land and Water Conservation Fund Act is subject to the protective and mitigative provisions contained in Section 6(f) of the Act. Larchmont Municipal Golf Course, a part of the Fort Missoula Recreation Complex, was partially developed with this funding source. Consultations with the Montana Department of Highways, the Montana Department of Fish, Wildlife and Parks, and Missoula County were conducted to determine the effects of the proposed widening of Reserve Street on the golf course property.[26,27,28] Based on these consultations, it was concluded that the right-of-way required for this project will not result in the taking of any golf course property. Therefore, provisions of Section 6(f) of the Land and Water Conservation Fund Act do not apply.

The build alternatives would require taking property from the playground of C.S. Porter School for additional right-of-way. This taking would reduce the size of the playground and require that some playground equipment and recreation areas be relocated. The impacts to this property are discussed in detail in Part V, "Section 4(f) Evaluation".

The no build alternative would result in a continuation of the existing level of service to recreation areas. Roadway width, pavement condition, and signing would remain unchanged, continuing the hazardous situations at intersections with old U.S.93, Dearborn Avenue and South Avenue which lead to nearby recreation facilities.

No other significant impacts to the recreational resources of the area are anticipated.

3. VISUAL

Visual quality is one of the most complex factors to analyze because its perception is dependent upon an individual's subjective assessment of the resource. The views of the new roadway from existing residential and commercial areas, as well as the visual perception of the roadway from the motorist's perspective, are relative points to consider in assessing the overall visual impact of the project.

The primary visual quality impacts associated with construction of any of the build alternatives will result from the acquisition and subsequent clearing of the additional right-of-way from the properties adjacent to the west side of Reserve Street. This clearing of vegetation will enhance views from the roadway of mountains surrounding the Missoula Valley by creating sightlines to these features from areas where vegetation previously obstructed such views. Loss of several mature spruce trees from the new right-of-way between South Seventh Street and South Third Street will significantly impact the visual resources of the project area. None of the construction alternatives should significantly alter the motorists' perception of foreground visual features such as the golf course or agricultural lands.

The view of the road from existing residential and commercial areas will be altered significantly by construction of the project. The typical roadway sections for the build alternatives, especially for the four-lane alternatives, will appear to be quite massive when compared to the existing 20-foot-wide roadway. This perception of the road by area residents and visitors must be tempered by the increased traffic capacity and the safety benefits offered by these alternatives. Careful revegetation and landscaping of right-of-way areas disturbed by construction activities will help to restore or enhance areas adjacent to the roadway.

F. ENERGY ANALYSIS

Energy requirements for the various alternatives described in this study were analyzed to determine the effect each alternative would have on overall energy consumption. Transportation facilities result in the direct consumption of energy by vehicle usage and in indirect consumption of energy by construction and maintenance activities for the roadway and the vehicles using the facility. For the purposes of this evaluation, four measures of energy consumption were specifically identified for each alternative and include: 1) the fuels required to operate vehicles utilizing the roadway; 2) the energy consumed during construction and maintenance of those vehicles; 3) the energy consumed by construction activities; and 4) the energy consumed during annual maintenance activities.

The methodology used for analyzing the energy use by alternative was taken from the handbook Energy Requirements for Transportation Systems, prepared by J.A. Apostolos for a Federal Highway Administration workshop in 1979.[29] Energy consumption figures are expressed in British Thermal Units (BTUs) and converted to equivalent barrels of oil per day for comparison purposes. The amount of energy consumed during roadway construction was based on preliminary estimates of construction costs.

The projected energy consumption for each of the roadway alternatives is contained in Table No. 15. A comparison of energy consumption between alternatives indicates that there would be little if any difference in energy consumption between the three-lane and four-lane build alternatives. Notable increases in energy consumption may be expected with construction of the two-lane alternative or continued use of the existing roadway. This expected increase in energy consumption may be attributed to the projected decrease in level of service offered by these lesser facilities.

TABLE NO. 15

ENERGY CONSUMPTION BY SOURCE
EQUIVALENT ANNUAL CONSUMPTION IN BTU $\times 10^{10}$

Description	88' 4-Lane	82' 4-Lane	74' 4-Lane	58' 3-Lane	44' 2-Lane	No Build
Direct: Vehicle Fuels	9.71	9.71	9.71	10.08	12.98	17.22
Indirect: Vehicles	7.28	7.28	7.28	7.28	7.28	7.28
Indirect: Construction	0.43	0.40	0.38	0.32	0.27	0
Indirect: Maintenance	0.10	0.09	0.09	0.06	0.05	0.08
Total Energy BTU (Annual Avg.)	17.52	17.48	17.46	17.74	20.58	24.58
Equivalent Barrels of Oil per Day	83	83	83	84	97	116

G. CONSTRUCTION IMPACTS

Since the construction activities would involve extensive excavation and earthwork, potential impacts associated with the construction phase of each project must receive special consideration. The nature of the construction impacts will differ from those of a completed roadway. Since the existing resources and ecological systems can be disrupted by the nature of roadway construction activities, the resource categories pre-

viously identified have been reviewed again from this perspective. Due to the fact that roadway construction techniques are relatively standardized, previous construction projects of a similar nature have been used as a basis for projecting road building activities and their potential resulting impacts.

A detailed discussion of these impacts is summarized herein.

1. PHYSICAL ENVIRONMENT

a. Geology and Soils

The most direct physical alteration of surface and subsurface materials would occur during the construction phase. The result of such construction activity would be the displacement and redistribution of existing soil and subsurface materials. The nature of the material likely to be encountered within the construction limits of the project may be easily excavated by power shovels or track-type tractors. Prior to excavation, topsoil would be stripped and stockpiled. At the conclusion of the construction activities, this topsoil will be replaced on disturbed areas and revegetation of these areas will be completed. The Montana Department of Highways specifications governing optimum moisture content and compaction of the original ground and embankment materials would assure that the roadway base would perform effectively over the service life of the facility.

As a result of these protective measures, no lasting adverse impact to the geology or soils of the area is expected.

b. Water Resources and Quality

1) SURFACE WATER RESOURCES

The major threat to surface water quality due to the construction phase of a new roadway project along the corridor would be the potential for sediment picked up by runoff from the construction site polluting watercourses. Such pollution involves primarily native soil particles and dissolved minerals. Suspended solids, typically clay particles, would be the major concern; of secondary interest would be soluble salts and minerals.

It is obvious that the larger the area disturbed by the highway construction, the greater the potential for pollution. In this regard, the alternatives would become progressively less favorable with increasing roadway widths and resultingly larger areas of disturbance.

The potential for surface water impacts from construction could be effectively mitigated by proper construction practices. The Montana Department of Highways Standard Specifications for Road and Bridge Construction contains provisions to protect water quality during construction. Selected provisions of these specifications are reproduced in Table No. 16.[30]

TABLE NO. 16

STANDARD EROSION CONTROL PRACTICES

1. The Contractor shall submit to the Engineer for approval a program for effective control of water pollution.
2. The Contractor shall meet the requirements of the applicable regulations of the Department of Fish, Wildlife and Parks, Department of Health and Environmental Sciences, and all other state or federal regulations relating to the prevention or abatement of erosion, water pollution, and siltation.
3. Throughout construction, the Contractor shall exercise every reasonable precaution to prevent pollution and siltation of rivers, streams, or impoundments.
4. In case of failure on the part of the Contractor to control erosion and water pollution, the Engineer reserves the right to take whatever action is necessary to provide the proper corrective measures.

2) GROUNDWATER RESOURCES

The only opportunity for adverse impacts to groundwater quality due to highway construction would involve the percolation of contaminated surface waters into the groundwater. This differs from the situations described previously in that the contaminants contained in such construction site runoff would not typically include the heavy metal fractions or traffic-related contributions. Rather, the pollutant load would primarily involve native materials that were transported by the runoff. The characteristics of the area would indicate that the primary contaminants thus contained in the runoff would be suspended sediment and dissolved minerals. The sediment fraction would effectively be removed by physical filtration as the water percolates through the soil and no measurable impacts are expected for any of the alternates.

c. Air Quality

Construction activities are expected to have a temporary adverse air quality impact on the Reserve Street project area with any of the build alternatives. Emissions generated by excavation and hauling activities would increase the level of fugitive particulates (dust) and may produce a dust nuisance to local residents and commercial establishments. The magnitude of such emissions would be directly related to the scope of the construction activity, and could be expected to be somewhat greater with the construction of wider roadway sections.[31]

Gaseous emissions would be generated by large gasoline and diesel engines on construction vehicles and equipment. The amounts of such emissions would be dependent upon the size of the roadway being constructed as more equipment and support vehicles would be needed for efficient construction of wider roadways. Additional particulate and gaseous emissions would be generated by the processing of roadway surfacing materials.[31] This source of emissions will not affect air quality in the immediate project area since processing plants for surfacing materials will be located some distance away from the work site.

Precautions may be taken to minimize the air quality impacts likely to be experienced during construction of the roadway. These measures include the use of water or chemical additives to minimize dust generated within the construction site; vehicle speed restrictions; and the use of mulch and prompt reseeding of disturbed areas to minimize the potential for wind erosion. Compliance with all federal, state and local air quality regulations as well as all standard specifications and practices of the Montana Department of Highways relating to air quality would be required and enforced.

d. Noise

Assessment of construction noise impacts is dependent upon the noise source, its intensity, and the location and sensitivity of the noise receptor relative to the source. Construction noise will be generated by both mobile and stationary equipment. Mobile equipment consists of machinery such as dozers, scrapers or graders which operate in a cyclic fashion of full power followed by a period of reduced power. Stationary equipment consists of fixed power equipment such as pumps, generators and compressors or impact equipment like jackhammers or other pneumatic tools. Typical ranges in noise levels generated by construction equipment at a distance of fifty feet were compiled by the U.S. Environmental Protection Agency, and are contained in Table No. 17.[31] The type of equipment and its accompanying noise levels will vary throughout the project since construction activities will be completed in phases.

TABLE NO. 17

TYPICAL NOISE LEVELS FOR SELECTED CONSTRUCTION EQUIPMENT[31]

Type	Noise Levels (dBA) at 50 ft.
Mobile Equipment	
Trucks	91
Dozers	80
Cranes	83
Scrapers	88
Graders	85
Rollers	74
Backhoes	85
Concrete Mixers	85
Paving Machines	89
Stationary/Impact Equipment	
Air Compressors	81
Jackhammers	88
Power Saws	78
Pneumatic Tools	85
Concrete Vibrators	76

Several land uses adjacent to the Reserve Street project will be sensitive to the noise generated by construction equipment. The most sensitive noise receptors include C.S. Porter School, two churches, and the residential areas adjacent to the roadway. The professional offices, commercial establishments and open areas adjacent to Reserve Street are considered to be moderately sensitive to construction noise impacts.[32]

Noise impacts due to construction activities are anticipated with any of the build alternatives, especially in residences and commercial establishments directly adjacent to construction zones. Several measures will be implemented to minimize impacts to noise sensitive uses along Reserve Street. One of the measures which will be utilized for this project includes the limitation of workhours on the construction site to daylight hours only. In addition, diesel and gasoline powered construction equipment will be required to be equipped with mufflers and be in continued good maintenance. It should be noted that construction noise impacts are of a temporary nature and use of these easy-to-implement measures should minimize most impacts likely to be experienced during the construction phase of this project.

2. BIOLOGICAL ENVIRONMENT

a. Vegetation

Construction of a new roadway of any design would entail stripping the vegetation cover and topsoil from the work area prior to any earthwork activities. The area to be affected by construction is planted with introduced species of grass, trees and shrubs. Topsoil removed from these areas will be replaced after construction and vegetative cover will be re-established according to Montana Department of Highways specifications. The size of the area disturbed by construction activities depends upon the width of the selected roadway alternative. Wider roadway sections would result in more extensive vegetation removed than narrower sections.

b. Fish and Wildlife

Construction-related consequences to the wildlife of the project area are minor, regardless of the alternative selected for implementation. Wildlife in the immediate area of construction would be disturbed; however, the area in which construction would take place provides little wildlife habitat and has limited wildlife potential. Therefore, the adverse impacts resulting from construction of the project would not be significant.

3. HUMAN ENVIRONMENT

a. Socio-Economics

1) SHORT-TERM ECONOMIC IMPACTS

Construction of the proposed project would cause short-term economic benefits to occur in the Missoula and western Montana area economy. Project development would create jobs and income for construction workers and contractors. Expenditures by construction workers and local purchases by contractors would also benefit the area's economy.

Construction estimates provided by the Montana Highway Department indicate that project development would create the approximate equivalent of 40 to 50 man-years of employment. Actual construction is expected to occur in phases as funding becomes available. Construction of this project is expected to occur in the following phases: 1) improvement of intersections; 2) construction of approximately one mile of roadway

between South Avenue and Third Street; and 3) construction of approximately one mile of roadway between South Avenue and U.S. 93.[33] Table No. 18 contains an estimate of construction employment necessary for each phase of the project.

TABLE NO. 18

CONSTRUCTION EMPLOYMENT BY PROJECT PHASE

Phase	Duration	Number of Employees
Phase 1		
Intersections & Lighting	One Const. Year	5 - 6 (Oct.- May) 35 (June - Sept.)
Phase 2		
1+ Mile of Concrete Paving	One Const. Season May - October	15 (during May) 40 - 60 (June - Aug.) 15 (Sept. - Oct.)
Phase 3		
1+ Mile of Concrete Paving	One Const. Season May - October	15 (during May) 40 - 60 (June - Aug.) 15 (Sept. - Oct.)

The majority of jobs to be generated by project construction would be for laborers, electricians, teamsters, equipment operators and contractor's supervisory personnel. Skilled and semi-skilled construction workers are abundantly available in the Missoula - western Montana labor market area which includes Missoula, Butte, Helena and Kalispell. The Montana Department of Highways estimates 60 to 75 percent of non-management employees would be hired from this region.[33] If the successful contractor is also from western Montana, the majority of supervisory personnel would also be expected to be from the local area. Notably, the rates of management personnel to construction worker varies widely between contractors, limiting ability to estimate supervisory jobs to be created by the project.

2) DIRECT INCOME EFFECTS

The Montana Contractor's Association suggests that 25 percent of construction costs for urban roadway improvement projects are typically expended for construction worker wages.[34] Using this norm, the Reserve Street project construction worker wage payments would range from $778,280 to $1,170,185 depending on which alternative is

constructed. Hourly wages would vary by worker skill. Estimates of current wage levels by skill type are: Laborers - $10.60; teamsters - $13.93; electricians - $17.00 (avg.); and equipment operators $13.00 (avg.).[35]

TABLE NO. 19

ESTIMATED CONSTRUCTION WORKER EARNINGS

	88' Four-Lane	74' Four-Lane	82' Four-Lane	58' Four-Lane	44' Four-Lane
Local Workers	$ 702,111	$ 630,711	$ 671,680	$ 542,679	$ 466,968
Non-Local Workers	468,074	420,474	447,787	361,786	311,312
TOTAL EARNINGS:	$1,170,185	$1,051,185	$1,119,467	$904,465	$778,280

The preceding table assumes that only 60 percent of the available construction jobs would be filled by residents of Missoula or other western Montana areas. If the number of jobs held by local residents were to be higher, or if a local contractor were to be the successful bidder, then local income benefits accruing to the region's economy would increase correspondingly.

A portion of the project's engineering and contingencies budget would be used to pay wages and salaries of the Montana Highway Department personnel. These payments would also represent a positive direct income effect of the project, additionally benefitting the region's economy.

3) INDIRECT INCOME EFFECTS

The distribution of local and non-local employment is also important because of differences in personal expenditure patterns. Persons from the local area can be expected to spend nearly all of their project related earnings within the Missoula - Western Montana area. Non-local workers can be expected to expend 40 to 60 percent of their earnings within the region. Project earnings spent within the local region, create income for local businesses, a portion of which local businesses also respend locally. The re-circulation (the multiplier effect) of construction worker earnings within the local economy would create additional income and potentially a few employment opportunities for area residents.

The Missoula - Western Montana area economy is among the more sophisticated in Montana. Employment and income multipliers tend to be larger in this area than in less populated areas of the state. Estimates of local

indirect income effects of the Reserve Street Project are based on an economic model developed by Chalmers et al. in 1977.[36] The model categorizes counties by size of market area and goods and services provided. The Chalmers Model identifies the major western Montana counties as third-order counties, and assigns an income multiplier of $1.02 to every dollar expended within this area.

In determining indirect income effects it is assumed that local construction workers would spend 100 percent and non-local workers 50 percent of their earnings within the region. In calibrating the model estimated local expenditures by both local and non-local workers have been reduced by 22 percent to account for the proportion of Reserve Street Project costs to be paid by area local governments. Total income effects on Table No. 20 are developed by adding estimates of direct earnings by local construction workers discussed previously to local indirect income effects.

TABLE NO. 20

INDIRECT AND TOTAL LOCAL INCOME EFFECTS

	88' Four-Lane	74' Four-Lane	82' Four-Lane	58' Four-Lane	44' Four-Lane
Indirect Income	$797,317	$669,058	$712,518	$575,674	$495,360
Total Income Effects	$1,499,482	$1,299,976	$1,384,198	$1,118,353	$962,328

Income effects projected by Table No. 20 would increase should local workers achieve a capture rate of greater than 60 percent, or if a local contractor wins the construction contract. If the winning contractor chooses to purchase materials and equipment, such as concrete or fuel, from within the local region, this could also add considerably to the local derivative income benefits accruing to western Montana as a result of the project.

Expenditures by the Montana Highway Department personnel would also result in positive derivative income effects in the region's economy.

4) INDIRECT EMPLOYMENT EFFECTS

Reserve Street construction would not have major effects on local employment opportunities. The size of the construction work force is too

small and the duration of construction phases to brief to create many jobs. Direct expenditures by construction workers and resulting derivative income effects within the local economy, could be expected to be widely dispersed throughout the area, though a few businesses might temporarily add employees to accommodate temporary increases in business activity, most businesses could be expected to work harder or longer while maintaining existing employment levels.

If major construction materials, such as concrete, were to be purchased locally, this could cause temporary increases in employment for these firms providing such inputs.

5) PUBLIC AND PRIVATE SERVICES

The short-term population effects of Reserve Street construction activities would have very minor impacts on the availability of public and private services in the Missoula area. The maximum employment estimate provided by the Montana Highway Department would predict 60 construction workers for a period of four months. Over half of these workers would be expected to already be residents of the region. Even assuming all non-local workers were accompanied by family members, and non-local management personnel were lured to supervise the project, the population influx would have little effect in a metropolitan area the size of Missoula.

Motels, hotels and trailer spaces, even assuming 95 percent occupancy would be available to house project workers. Due to the summertime exodus of students from the Missoula area, student housing would also be available to workers during peak construction periods.

b. Transportation

The transportation resources and facilities of the Reserve Street area would remain largely unaffected by the construction phase of any of the proposed roadway alternatives. It is expected that other roads and streets in the nearby area would experience short-term increases in traffic volumes as motorists utilize alternate routes to avoid construction detours and delays. Passenger bus service through the project area, like automobile and truck traffic, would not be significantly interrupted but would be subject to delays and detours. Air service and rail service would be unaffected by project construction.

c. Traffic Safety

As discussed in the preceding section, traffic along Reserve Street would be affected by construction of a new roadway. The anticipated delays and detours would require provisions for traffic safety in the construction area. The Montana Department of Highways, in conjunction with the construction contractor, would develop and employ a traffic control plan in and around work sites. It is likely that one-way routing would be required through localized areas of construction, resulting in short traffic delays. In order to facilitate traffic within the construction zone, a combination of temporary signing, flagmen, pilot vehicles, detours and mandatory speed reductions may be used.

Special consideration for safety during construction will be required at major intersections within the project limits due to the greater complexity of traffic movements at these locations. Use of the construction zone by pedestrians and bicyclists also merits special attention in the construction traffic safety program. In general, pedestrian access throughout the construction zone should pose no problems. OSHA-mandated warning devices on construction equipment provide an effective safeguard against potential pedestrian-equipment conflicts. Although bicyclists may be routed like motorized vehicles, their presence in construction zones warrants additional consideration.

4. CULTURAL, RECREATIONAL AND VISUAL ENVIRONMENT

a. Archaeological and Historical

Since no sites of archaeological or historical significance have been identified in the construction area, no adverse impacts will occur. If an unknown site or evidence thereof is discovered during the course of the construction, safeguards are contained in the MDOH Standard Specifications for Road and Bridge Construction to prevent these artifacts from being destroyed.

b. Recreational

The recreational sites in the study area, including Larchmont Municipal Golf Course and the Fort Missoula recreational complex, could be expected to experience some temporary impacts during the construction phase. It is expected that construction at major intersections leading to these sites would reduce the ease of access to the sites while work was

in progress. Alternate access routes to both areas are available for use by potential recreationalists. It is also expected that some temporary noise and dust impacts may be experienced by those using the portion of Larchmont Municipal Golf Course adjacent to Reserve Street. Both of these situations could serve as a deterrent to recreation at each site; however, the overall impact is anticipated to be slight.

c. Visual

An adverse impact to the visual quality of the study area is unavoidable in all alternatives involving construction activity. A certain amount of short-term unsightliness due to earthwork would result during construction. Due to the temporary nature of the construction and the required revegetation of disturbed areas, the overall significance of this impact is considered minor.

H. SUMMARY OF COSTS

1. CONSTRUCTION COST ESTIMATES

Construction costs were estimated for each of the roadway alternatives considered for this project. A set of plans and quantities were previously prepared for the 88-foot-wide four-lane roadway. Estimates of quantities for each of the remaining alternatives were determined from typical sections contained in this original design. Adjustments were made to the preliminary design quantities to account for the differences in each alternative, since detailed design plans are not available for each of the roadway layouts. Unit bid prices from the Department of Highways bid tabulations were applied to the quantities to arrive at construction cost estimates. The detailed quantities, unit prices and costs for each alternative are on file with and available for review at the Montana Department of Highways office in Helena.

The estimated construction costs for each alternative are contained in Table 21.

TABLE NO. 21

ESTIMATED CONSTRUCTION COSTS

	Alternative	Constr. Cost*	25% Engr. & Cont.	Total	Annual Cost**
1.	88' 4-Lane	$4,680,740	$1,170,185	$5,850,925	$687,247
2.	74' 4-Lane	4,204,743	1,051,185	5,255,928	617,359
2a.	82' 4-Lane	4,477,871	1,119,467	5,597,338	657,461
3.	58' 3-Lane	3,617,858	904,465	4,522,323	531,190
4.	44' 2-Lane	3,113,118	778,280	3,891,398	457,082
5.	No-Build	N.A.	N.A.	N.A.	N.A.

* Construction costs are based on 1984 dollars and assume Portland cement concrete paving over the length of the project.

** Based on 10% interest over a period of 20 years.

2. MAINTENANCE COSTS

Annual maintenance costs for the different alternatives were estimated using historic maintenance costs from the Department of Highways maintenance records.[37] To establish appropriate costs for each of the alternatives maintenance costs for both four-lane and two-lane urban highways were reviewed. Twelve roadways were selected based on their typical section and location within the urban area. Maintenance costs were broken out according to general maintenance (minor road repair, striping, signing, street clearing, etc.) and snow removal and sanding. Three years of maintenance data was used for each roadway to establish average annual costs. These maintenance costs are show in Table No. 22.

TABLE NO. 22

ANNUAL MAINTENANCE COSTS
(Per Mile)

Alternative	General	Snow Removal and Sanding	Total
88' Four-Lane	$9,064	$2,253	$11,317
82' Four-Lane	$8,446	$2,253	$10,699
74' Four-Lane	$7,622	$2,253	$9,875
58' Three-Lane	$5,974	$1,250	$7,224
44' Two-Lane	$4,532	$791	$5,323
No-Build	$8,700	$860	$9,560

Based on the average of the twelve roadways examined, the annual cost of general maintenance per mile of roadway is approximately $103 per foot of pavement width. Using this rate the cost of general maintenance for the five build alternatives was established.

The cost of snow removal and sanding was derived from the average annual cost for the four-lane and two-lane roadways examined. Considering current snow removal and sanding techniques it appears that the actual travel lanes receive the majority of the attention, and that there are no discernible differences in the cost to plow and sand a twelve-foot lane versus a 14-foot lane. Therefore, the snow removal and sanding costs for the three four-lane alternatives were considered to be similar. The two-lane cost for snow removal and sanding was based on the average of the two-lane roadways examined. The 58'-three-lane alternative costs were estimated based on the four-lane and two-lane costs.

The maintenance costs for the existing facility were based on three years of maintenance data received from Missoula County.[38] Missoula County maintains the section of Reserve Street being studied. There was no data available specifically for the study corridor; therefore, county-wide maintenance figures were used and adjusted for Reserve Street.

The basic information and methodology used to develop the annual maintenance costs is on file and available for review at the Montana Department of Highways office in Helena.

REFERENCES FOR PART IV

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1. Constituents of Highway Runoff, Volume III - "Predictive Procedure for Determining Pollutant Characteristics in Highway Runoff", Report No. FHWA/RD-81/044, FHWA Office of Research and Development, 1981, pp. 15-26.

2. Ibid, pp. 26-28.

3. Jack McKee and Harold Wolf, Water Quality Criteria, Second Edition, California State Water Resources Control Board, 1963, p. 258.

4. Wilbur Aiken, Water Quality Bureau, Montana Department of Health and Environmental Sciences (MDHES), in a personal communication, May 1981.

5. Steven, Pilcher, "Proposed Urban Stormwater Runoff Review Guidelines", Water Quality Bureau, MDHES (office memo), January 22, 1981.

6. ARM 16.20.1012(g), Subchapter 10, Montana Groundwater Pollution Control System, December 31, 1982.

7. Sludge Treatment and Disposal, Volume 2, EPA Publication No. EPA-625/4-70-012, Environmental Protection Agency, Washington, D.C., October 1978, pp. 104-106.

8. Joe Aldegarrie, Missoula City Engineer, in a personal communication, February, 1984.

9. Economic Impact of Highway Snow and Ice Control, Report No. FHWA/RD-77/95, FHWA Office of Research and Development, Washington, D.C., 1977, pp. 37-39.

10. Missoula Valley Water Problems, Volume IV, "Water Resources of the Missoula Basin, Western Montana and the Effects of Irrigation and Withdrawals on the Water Budget", by Geldon and Curry, University of Montana Department of Geology, 1978, pp. 36-42.

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11. "Emission Factor Correction Parameters for Paved and Unpaved Roads, Final Report - Part II", Midwest Research Institute for the Montana Air Quality Bureau, Dept. of Health and Environmental Sciences, November, 1978.

12. "Air Quality Impact of the Proposed Reconstruction of Reserve Street, South Third to Highway 93", James Carlson, Missoula City-County Health Department, August, 1980.

13. "CALINE3 - A Versatile Dispersion Model for Predicting Air Pollutant Levels Near Highways and Arterial Streets, FHWA/CA/TL-79/23", Office of Transportation Laboratory, California Department of Transportation, November, 1979.

14. "Mobile Source Emission Factors", U.S. Environmental Protection Agency Report No. EPA-400/9-78-005, March, 1978.

15. "Montana Air Pollution Study, Missoula Valley Dispersion Study", Air Quality Bureau, Montana Department of Health and Environmental Sciences, September, 1980.

16. "Montana Air Quality Data and Information Summary for 1982, Volume II, A Supplemental Report", Air Quality Bureau, Montana Department of Health and Environmental Sciences, September, 1983.

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17. Montana Department of Highways, Relocation Assistance Program, p. 10.

18. Clarence Walth, Missoula area realtor, in a personal communication, October, 1983.

19. Jim Fairbanks, Missoula County Appraiser, in a personal communication, January, 1984.

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20. Ann Clyatt, Administrative Assistant, Missoula Urban Transportation District, in a personal communication, January, 1984.

21. John Grew, General Manager, Missoula Urban Transportation District, in a personal communication, March, 1984.

22. Highway Capacity Manual, Special Report 87, Highway Research Board, Division of Engineering and Industrial Research, National Academy of Sciences - National Research Council, Washington, D.C., 1965, pp. 75-87.

23. Transportation Research Circular, "Interim Materials on Highway Capacity", Circular No. 212, Transportation Research Board, National Academy of Sciences, Washington, D.C., January 1980.

CULTURAL, RECREATIONAL & VISUAL ENVIRONMENT

24. Edrie Vinson for Ken Korte, State Historic Preservation Officer, Montana Historical Society, in a personal communication, September 4, 1978.

25. Tandy R. Ford, Anthropologist, Environmental Unit, Montana Department of Highways, in a memorandum, January 18, 1984.

26. Ron Aasheim, Project Coordinator, Montana Department of Fish, Wildlife and Parks, Parks Division, in a personal communication to R.E. Champion, MDOH, October 24, 1980.

27. Board of County Commissioners, Missoula County, in a personal communication to R.E. Champion, MDOH, April 11, 1979.

28. Steve Kologi, Preconstruction Bureau, MDOH, in a personal communication to Missoula County Commissioners, April 12, 1979.

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32. John G. Rau and David C. Wooten, Environmental Impact Analysis Handbook, McGraw - Hill Book Company, 1980.

33. Don Fiske, Construction Bureau, MDOH, in a personal communication, March 1, 1984.

34. Bill Olson, AGCA, Montana Contractors Association, in a personal communication, March 5, 1984.

35. Typical Davis-Bacon wage rates from Federal Register, Volume 48, No. 238, December 9, 1983.

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SUMMARY OF COSTS

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PART V: SECTION 4(f) EVALUATION

PART V: SECTION 4(f) EVALUATION

A. PURPOSE AND REQUIREMENTS

Section 4(f) of the 1966 U.S. Department of Transportation Act (23 U.S.C. 138) states that an effort must be made to preserve the natural character of public parks and recreation areas, wildlife and wildfowl refuges, and historic sites that would be affected by roadway construction projects. Section 4(f) requirements are applicable if a proposed roadway project:

* Takes land from a publicly-owned, significant National, State or local park, wildlife refuge or recreation area.

* Takes land from a significant National, State, or local historic site.

* Uses land from a publicly-owned tract that is not officially designated as a park, recreation area or wildlife refuge, but that is being used for this purpose on a permanent basis if the official having jurisdiction believes its use as a 4(f) type area is significant.

In addition, the requirements of Section 4(f) are stated in 23 CFR Subsection 771.133 as follows:

> "No administrative action will use land from a significant publicly owned park, recreation area or wildlife and waterfowl refuge or any significant historic site unless a determination is made that:
>
> (1) There is no feasible and prudent alternative to the use of land from the property; and
>
> (2) The proposed action includes all possible planning to minimize harm to the property resulting from such use."

The purpose of the following parts of this Section 4(f) evaluation is to identify potentially affected publicly owned properties, assess the impacts on each property, and demonstrate that the project complies with the Section 4(f) requirements.

B. SECTION 4(f) RESOURCES

The C.S. Porter School and its playground are located between Central and North Avenues on the west side of Reserve Street. The school and playgrounds consist of approximately 6.1 acres owned by School District No. 1, Missoula County, Montana. Playground facilities at the school consist of a softball field, basketball and volleyball courts, climbing bars and swings. Figure No. 15 depicts the playground facilities that exist at C.S. Porter School. These facilities are available for public use and are used by neighborhood children. Based on this usage, the school playground has been determined to be a significant recreational area by the principal of C.S. Porter School, with concurrence of the school's Board of Trustees.[1]

The school property, which is a part of U.S. Government Subdivision Number 2 in Missoula County, was originally acquired by patent from the federal government. The patent is subject to limiting use conditions whereby title to the land will revert to the federal government if title or control of the land is transferred without the approval of the Secretary of the Interior.[2] Preliminary contacts concerning such approval have been made with the Bureau of Land Management Regional Office in Billings, Montana.

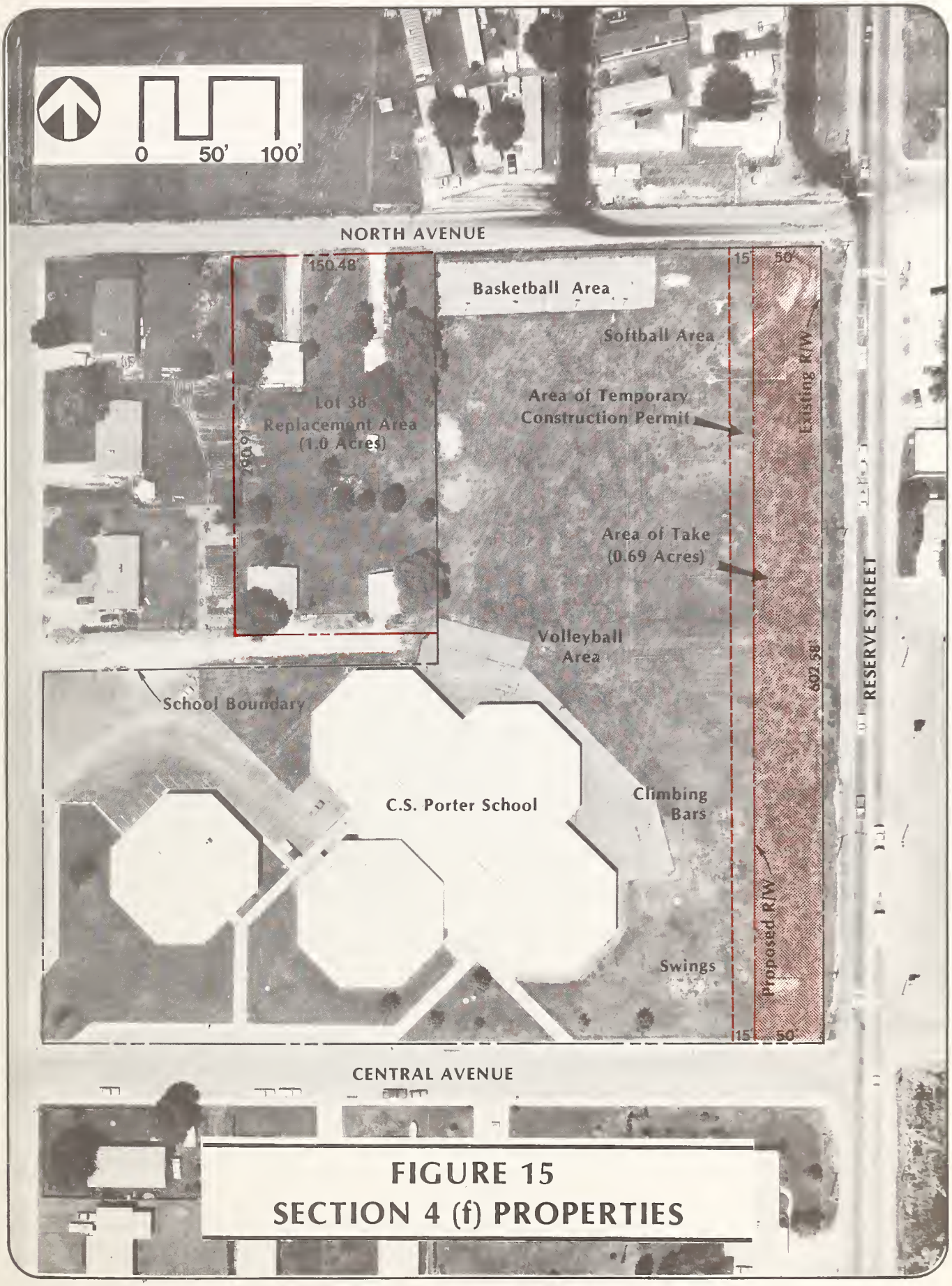

FIGURE 15
SECTION 4 (f) PROPERTIES

C. IMPACTS OF SECTION 4(f) RESOURCES

Construction of any of the four-lane build alternatives will require that a strip of land be taken from the east edge of the C.S. Porter School playground. In order to accommodate the wider roadway alternatives, a strip of property 50 feet wide by 603 feet long, or 0.69 acre, would be taken from this portion of the school grounds. In addition, a parcel 15 feet wide by 603 feet long, or 0.21 acre, would be required for a temporary construction permit to allow slope adjustments to be completed. Figure No. 15 depicts the areas required for additional right-of-way and for a temporary construction permit. This proposed right-of-way will accommodate any construction alternatives considered for this project and will be acquired for all build alternatives. The acquisition of the proposed right-of-way would also be sufficient to handle future improvements to Reserve Street. The impacts resulting from the taking of schoolground property would therefore be similar for all construction alternatives.

The proposed right-of-way taking of 0.69 acre would reduce the present schoolground acreage to 5.41 acres. This reduction would crowd the existing playground equipment and would require that the softball field be relocated to another part of the grounds. The use of these facilities would be disrupted during the relocation process.

Increases in both noise and air pollution will be experienced during construction activities and as traffic volumes increase in the future. A beneficial impact to schoolground property would result from the storm drainage facilities which would be constructed with any of the build alternatives.

D. AVOIDANCE ALTERNATIVES

The location of this project is determined by the existence of Reserve Street and the previously completed segments of Federal Aid Urban Route 8103. Therefore, the only alternatives to the proposed taking of C.S. Porter School grounds would involve alternate alignment, reducing the size of the proposed facility, or selection of the "no build" alternative.

The taking of C.S. Porter School property could be avoided if the roadway alignment of the proposed project were moved to the east. This alignment change would require that the additional right-of-way be

taken from the more densely developed properties adjacent to the east side of Reserve Street. This would require that 55 parcels, including 21 residential dwellings, 7 commercial buildings, and 2 service stations, be acquired and relocated. The estimated total cost associated with this right-of-way taking would be nearly $4,000,000, which includes $3,600,000 for acquisition costs and nearly $400,000 for relocation of families and businesses.[3,4]

The persons and families who would be displaced by this easterly alignment are of no minority or particular ethnic group, and all age groups would be somewhat affected. Although replacement housing is available in the Missoula area, it is improbable that all those displaced by this action could be relocated in the same general area of Missoula. Businesses displaced by this alternate alignment could be relocated, but would undoubtedly suffer economic hardships until re-establishment was completed. In addition, employees of these businesses may be severely impacted if they are laid off during moving and re-establishment of these firms. The vacant land created by removal of residences and businesses would be attractive as commercial properties, and a trend toward rapid commercial conversion of the area may result. This situation may be enhanced by expected land value increases which may result in the conversion of residential properties to commercial uses.

The proposed alignment will require the acquisition of 26 parcels at an estimated cost of nearly $1,000,000.[4] Included in these parcels are 24 households and properties under State and County ownership. Relocation of these residents would cost an estimated $126,000.[5] Therefore, the cost of the proposed alignment is approximately $2,900,000 less than if the alignment is shifted to miss the C.S. Porter School playground. The proposed alignment would also result in significantly less community disruption in terms of residential and commercial relocation.

An improved two-lane facility could be constructed within the existing 60-foot right-of-way which could accommodate two 12-foot driving lanes, two 10-foot shoulders, two 5-foot sidewalks, and curb and gutter. This alternative would provide some benefits to motorists; however, the facility would not have the capacity needed for the 22,000 vehicles per day projected to use the roadway in the design year 2005.

None of the remaining alternatives considered in this study, including the three-lane and four-lane options, could be constructed within the existing right-of-way. Although numerous alternative designs that would require somewhat less right-of-way are possible, it is felt that in each instance, these lesser facilities would compromise the safety and roadway capacity of the proposed project without a substantial reduction in impacts on the C.S. Porter School playground.

The "no build" alternative would leave Reserve Street in its present condition. This facility has become deteriorated due to its age and the heavy traffic volumes it must handle. The present roadway has two 10-foot driving lanes and is incapable of handling present traffic volumes in a safe manner. Traffic on Reserve Street will continue to increase with or without improvements, and selection of the "no build" alternative will worsen the existing situation.

Selection of a final alternative will be made following the circulation of the Draft Environmental Impact Statement/Section 4(f) Statement and after comments have been received through the NEPA process and public hearings. Based on the studies to date, it is apparent that there is no reasonable alternative to taking a portion of the C.S. Porter School playground.

E. MITIGATION

Mitigation of impacts to the C.S. Porter School playground began in 1978 when the preliminary design of an 88-foot four-lane roadway was being prepared. Probable impacts on the school property were addressed at that time and representatives of the C.S. Porter School, P.T.A. and the School Board were informed of the probable taking of 0.69 acres of playground for new right-of-way. In response to this proposed right-of-way taking, the group indicated that the only way to mitigate this loss was to acquire a replacement parcel adjacent to the school property.[3] In the intervening years, a replacement parcel of land described as Lot 38 of U.S. Government Subdivision Number 2 in Section 30, Township 13N, Range 19W, PMM, has been acquired by the Montana Department of Highways. This parcel is 1.0 acre in size and improved with four single-family dwellings which are presently used as rental units. All four dwellings are presently occupied by tenants of the State. The original tenants of these rental units have received or will receive relocation assistance.

Prior to the construction of the project, the Department of Highways will remove the buildings on Lot 38 and restore the surface of the lot to be compatible with the existing playground. Affected playground equipment will then be relocated as recommended by school officials. These activities will be accomplished with the least possible disruption to school activities and use of the playground.

Based upon the noise studies conducted for this EIS, the predicted exterior L_{10} dBA noise levels for the C.S. Porter School property would not exceed the FHWA maximum noise level of 70 dBA for such uses. Predictions of exterior noise levels based on the preferred alternative and the design hourly traffic volumes for the design year (2005)

indicated that playground locations within 150 feet of the existing roadway centerline would exceed the recommended maximum noise level. Predicted interior noise levels will not exceed the recommended FHWA maximum of 55 dBA. Construction of a noise barrier between Reserve Street and the school has also been considered as a measure to lessen noise impacts from traffic. The present schoolground is surrounded by a chain link fence which limits access to the street. Construction of a noise barrier would require additional right-of-way, and such a structure may be aesthetically undesirable. The decision regarding whether or not to build a noise barrier in this location will depend a great deal upon the recommendations of school officials.

F. COORDINATION

Preliminary coordination regarding the taking of C.S. Porter School playground property was undertaken with the C.S. Porter Parent Association, the administration of C.S. Porter School and School District No. 1, and the Missoula County Parks and Recreation Department.[1] School officials were informed of the proposed project and probable impacts at an informational meeting held during April, 1978. As a result of this meeting, the C.S. Porter School playground was determined to be a significant recreation area, and acquisition of a replacement parcel next to the school property was determined to be the proper mitigation for loss of the playground area. Subsequently, a replacement parcel was acquired by the Montana Department of Highways.

The C.S. Porter School property was acquired by patent from the United States under a limiting use condition whereby consent of the Secretary of Interior is necessary prior to a transfer of title or control of the land.[2] Due to such limitations, preliminary coordination with the Department of the Interior, Bureau of Land Management in Billings, Montana, has been initiated regarding the disposition of the playground area affected by this project.

In addition, coordination with the public and other groups and agencies will result from the circulation of the draft EIS and the public hearing process.

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3. Montana Department of Highways Draft Section 4(f) Statement, 1982.

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PART VI: MITIGATING MEASURES

PART VI: MITIGATING MEASURES

There are a number of mitigating measures that will be undertaken to reduce the impacts of the proposed roadway construction project. These measures are summarized in the following narrative.

A. GEOLOGY AND SOILS

Specific data regarding the properties and limitations of surface and subsurface material to be encountered during construction will be evaluated during the design phase of the project. This information will provide parameters for road base preparation and will aid in the development of excavation and embankment quantities.

B. VEGETATION

During construction, much of the topsoil and vegetative cover will be stripped from the right-of-way due to earthwork operations. The topsoil

will be removed, stockpiled and use to cover cut and fill areas for revegetation. The establishment of strict construction limits and the removal of only the necessary vegetation during clearing activities will prevent unnecessary disturbance of roadside vegetation. The revegetation of disturbed right-of-way areas with grasses will be in accordance with Montana Department of Highways construction specifications for roadside development.[11]

C. WATER RESOURCES

The use of a central storm drainage system on the new roadway will have several benefits in minimizing water resource impacts of the project. The inclusion of seepage pits for most stormwater inlets will encourage percolation of the lower, comparatively more concentrated flows utilizing natural filtration and soil attenuation to remove pollutants. The more dilute, larger flows will ultimately be discharged to adjacent rivers, but the impact of the pollutant load will be negligible. Central collection will also reduce overland drainage currently reaching irrigation canals, thereby preserving or improving present canal water quality. It should be noted that if a phased approach to construction of the roadway is used, consideration must be given to the scheduling of installation of storm drainage facilities. A contiguous drainage system should be maintained, and adequate outlets for phased facilities must be provided or the entire drainage system must be installed at the same time. These factors should be considered during facilities design.

Portions of the existing irrigation canal system that crosses or parallels Reserve Street will be impacted by roadway construction. New hydraulic structures will be provided where the canals cross Reserve Street. Parallel sections of the canal system will be relocated within the new right-of-way and will be reshaped and lined with concrete.

Revegetation of unpaved right-of-way areas after construction will enhance natural filtration of surface runoff percolating into the soil. The depth of groundwater in the area is an additional safeguard against quality degradation, insuring a long distance of percolation for thorough filtration and soil attenuation of runoff pollutants.

Water resource impacts of the project are further minimized or prevented altogether by the absence of any major surface water drainages on the project corridor. Adherence to MDOH construction standards for water quality management will minimize impacts to surface and groundwater quality during the construction of the project.

D. UTILITIES

At the time of road construction the City also has definite plans to install the casings for existing and planned lateral sewer crossings to save the later cost of boring such crossings or disrupting large sections of pavement. The roadway alternatives under consideration would vary slightly in the lengths of casing required, but the economic impact of this difference is also minimal. The Reserve street lift station has already been relocated and upgraded to accommodate street expansion and future sewage flows.

E. NOISE

Measures to mitigate noise impacts may be utilized during project construction and after the facility becomes fully operational. Measures to reduce the short-term adverse impacts likely to be experienced during construction were previously discussed in Section G of Part IV, "Environmental Consequences", of this report. Long-term noise impacts may be reduced through the implementation of three types of mitigating measures which include: 1) control of the noise source; 2) control of the noise path; and 3) control of the noise receiver. These three categories are discussed in the following narrative.

The views of the impacted residents will be considered in reaching a decision as to the abatement or control measures to be provided along this project prior to the issuance of the final Environmental Impact Statement.

1. CONTROL OF THE NOISE SOURCE

Measures to control the noise source are limited to traffic management policies that would restrict the use of Reserve Street by trucks or other noisy traffic to particular hours of the day or prohibit such traffic altogether. Implementation of a policy such as this would require that another link in the Missoula road and street network be designated as a truck route. Although this situation may be viewed as desirable by residents of the Reserve Street area, it is impractical since Reserve Street provides the most direct and efficient connecting link between U.S. 93 and Interstate 90. The expense of locating and constructing an alternate truck route west of the Reserve Street area precludes its consideration as a feasible mitigating measure.

2. CONTROL OF THE NOISE PATH

One of the most effective means of providing noise relief is with the use of noise barriers, typically walls or berms, which are designed to block the line-of-sight between the roadway and nearby locations. In order to afford a noticeable reduction in noise levels, the barrier or berm must be continuous between cross streets and at least ten feet in height. Noise barriers are most often constructed of wood, metal, concrete, masonry or earth. Unless special care is taken regarding the design of the noise barrier, the structure may be aesthetically unappealing. The construction of an earth berm may require additional right-of-way if effective barrier height is to be reached due to the physical properties of the material.

Based upon the noise studies conducted for this EIS, it was determined that the FHWA maximum recommended exterior noise level (70 dBA) for residential areas will be exceeded at locations within 150 feet west and 100 feet east of the existing centerline of Reserve Street. Commercial areas along Reserve Street will not exceed recommended limits in the design year. Use of a barrier to attenuate noise in areas adjacent to the west side of Reserve Street is not considered practical since the right-of-way required by the proposed project will result in the relocation of most residents likely to experience noise impacts. A noise barrier along the east side of the roadway would be ineffective due to the breaks in the barrier required by the numerous private accesses along this portion of Reserve Street.

3. CONTROL OF THE NOISE RECEIVER

Modification or control of the noise receiver in the immediate area of the roadway is an effective means of mitigating noise impacts. Existing buildings may be modified with additional insulation or air conditioning to provide an acceptable interior noise level. To date, highway funds have not been expended for this type of noise mitigation on Federal-aid projects in Montana. Another effective means of noise control may be to encourage the location of less sensitive land uses and development along the transportation corridor. Land use planning and zoning regulations may help alleviate problems before they develop.

F. RELOCATION ASSISTANCE

The proposed improvements to Reserve Street will require additional right-of-way along the west side of the roadway resulting in the taking of 24 dwellings and one seasonal business. The Montana Department of

Highways will extend relocation services to all displaced persons under the provisions of the Highways Relocation Assistance Program. This program, which is administered by the Chief of the Right-of-Way Bureau, requires a 90-day notice to displacees and provides supplemental housing payments, moving costs, advisory assistance, and other services to individuals displaced by the project. These payments are in addition to the compensation paid for the acquired right-of-way.[2] A Relocation Plan and actual appraisals of properties will be prepared at the time the roadway alternative has been selected and authorized. The Relocation Assistance Program was explained at a public meeting held on February 8, 1984 in Missoula.

The MDOH District Office in Missoula also maintains pertinent information regarding the project area such as an inventory of replacement dwellings, current financing data, and brochures explaining the relocation program. Individuals may contact this office or the Right-of-Way Bureau in Helena for further information.

G. TRAFFIC SAFETY

The proposed reconstruction project for Reserve Street will reduce or eliminate many unsafe conditions presently associated with the roadway. The provision of a six-foot-wide shoulder along each side of the roadway will allow bicyclists to travel in a separate lane and reduce the potential for conflicts with motor vehicles. A five-foot-wide sidewalk will be provided for pedestrians over the length of the project except in the area on the west side of Reserve Street adjacent to the Larchmont Municipal Golf Course. The provision of this facility will eliminate the need for pedestrians to walk along the edge of the roadway.

The overall safety of Reserve Street motorists will be increased by many design features of the proposed roadway. Numerous intersections along the roadway will be made safer by the provision of separate turn lanes which will reduce the number of collisions at such locations. The additional cleared right-of-way for this project will increase the safety at several Reserve Street intersections by eliminating roadside vegetation which presently obscures the vision of approaching motorists. The designation of Reserve Street as a "limited access facility" and the acquisition of unneeded private accesses by the Montana Department of Highways will result in a safer, more efficient roadway. Street lighting along Reserve Street will be limited to six major intersections including: U.S. 93 (Brooks Street), South Avenue, North Avenue, Spurgin Road, South Seventh Street, and South Third Street.

REFERENCES FOR PART VI

1. Standard Specifications for Road and Bridge Construction, 1981 Edition, adopted by the Montana Department of Highways and the Montana Highway Commission.

2. Montana Department of Highways, Rules for Relocation Assistance, p. 10.

LIST OF PREPARERS

LIST OF PREPARERS

The Montana Department of Highways and the Federal Highway Administration are responsible for the preparation of this Environmental Impact Statement. Due to the scope of the project and the wish to expedite the study, consultants were retained to provide preliminary design services and to assess the impacts of each roadway alternative selected for consideration. It is the responsibility of the consultant to prepare the EIS and coordinate the study with cooperating state and federal agencies. The Montana Highway Department has the responsibility for formulating all conclusions and recommendations contained in this study.

The prime consultant is Robert Peccia & Associates, Inc., Engineers, Planners and Designers, located in Helena, Montana. The firm was responsible for providing much of the transportation, civil and environmental engineering analysis completed for this study. Robert Peccia & Associates also retained the services of two other subcontractors to provide additional expertise for various segments of the EIS. Boyer Consulting, a firm based in Helena, Montana, was retained to inventory existing socio-economic conditions in the project area and assess the socio-economic impacts to the area due to the construction of the project. OEA Research, also based in Helena, was retained to provide studies and impact assessments regarding vegetation and wildlife within the Reserve Street project area.

The Montana Department of Highways provided estimates for right-of-way and relocation costs, existing traffic counts and data, measurement of existing noise levels, preliminary right-of-way and design plans for the 88-foot alternative, information regarding archaeological/historical resources, and previous correspondence and work files. Federal Highway Administration personnel also provided technical expertise and policy guidance during the preparation of this document. The primary representatives of the state and federal agencies who were responsible for providing technical support and review comments on this EIS are as follows:

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In addition to these individuals, members of the Missoula Transportation Advisory Committee (TAC) assisted in the development of the recommendations contained in this EIS. The following list identifies the membership of this committee and the agencies or groups they represent:

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GLOSSARY

alignment: the ground plan of a highway
alluvium: unconsolidated sediments deposited by streams
ambient: existing background conditions
annual average daily traffic: a measurement of traffic derived by dividing the total year's traffic by 365; abbreviated as AADT
aquifer: a stratum of water-holding rock, especially one that supplies water for wells, springs, etc.
attenuation: a reduction in severity or lessening in force
baseline: existing situation or conditions used for comparison with future projections
B-1: a water classification of the State Water Quality Bureau for water which is suitable for drinking, culinary and food processing purposes, after conventional treatment; bathing, swimming and recreation; growth and propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers; and agricultural and industrial water supply. Parameters for this classification can be found in ARM 16.20.618, 9/30/80.
Btu: British Thermal Unit; the quantity of heat required to raise the temperature of one pound of water one degree Fahrenheit at or near 39.2°F and standard pressure
capacity: the maximum number of vehicles per unit of time that can be handled by a particular roadway component under the prevailing conditions
carry-out: air contaminants not dispersed in the atmosphere, absorbed by rain or snow and deposited on the ground near the source of the contaminants, or moved by wind to another location
CO: Carbon Monoxide, the most abundant pollutant in motor vehicle exhaust resulting from incomplete combustion within the vehicle engine
construction impact: a direct environment impact resulting from construction activities; these impacts are often temporary in nature (i.e., noise impacts generated by construction equipment)
dBA: a weighted scale reading in decibels giving a measurement of sound level
decibel: unit of noise measurement, a logarithmic measure of sound pressure
DEIS: Draft Environmental Impact Statement
design hourly volumes: determined by multiplying the average annual daily traffic by a percentage of the average daily traffic per hour expected for the design year. The selection of this volume is a compromise between the cost of the facility and the annual service provided by the facility.

design year: the year for which a particular facility is designed (usually 20 years from the date of construction)
dissolved solids: substances that are soluble in water but which remain as a residue when the water evaporates
DNRC: Montana Department of Natural Resources & Conservation
drop-off rate: a decrease in traffic noise levels proportional to an increase in distance from a roadway
effluent: discharged liquid, especially from septic tanks
EIS: Environmental Impact Statement
EPA: Environmental Protection Agency
fault: a fracture along which movement of rock along opposite sides occurs
FHWA: Federal Highway Administration
fluvial: concerning or pertaining to rivers or streams
fugitive dust: a type of particulate typically originating from street sanding or runoff-deposited silts which is reintroduced into the atmosphere through vehicle movement over the material
heavy metals: metals such as lead, zinc and mercury that can be toxic in small quantities
housing unit: a house, apartment, group of rooms or single room occupied or intended for occupancy as separate living quarters
infrastructure: the organizational structure of a community
injury accident: a vehicle accident which resulted in at least one injury to those involved
L10: the level of sound exceeded ten percent of the time, or exceeded six minutes in a 60-minute time period
MDHES: Montana Department of Health and Environmental Sciences
MDOH: Montana Department of Highways
million vehicles miles (MVM): a measure of vehicle miles travelled over a particular roadway section, often used in accident analyses to determine accident rates for a roadway section over a specific period of time. This quantity is derived by multiplying ADT by length of segment and period (days), and dividing the result by one million.
mitigation: the act of lessening the severity of impacts on the environment as a result of the implementation of a proposed project
model: a mathematical formula or computer program developed to represent selected future conditions within the study area. Models were employed in this EIS to predict air quality impacts, noise levels, water quality impacts, etc.
non-attainment area: an area currently under a state implementation plan where present particulate levels exceed national standards as determined from actual sampling
particulate: composed of distinct particles
pollutant load: the net mass of a pollutant or pollutants contained within a given volume of air or water
primary impact: an impact directly resulting from an action (i.e., increased noise levels during construction)

property damage accident: a vehicle accident which resulted in damage only to vehicles or other property
queuing: the relationship between vehicles within a line which may or may not be moving; often examined characteristics of this relationship include spacing, density and headway
scenario: a possible course of development
scoping: the process used to identify the significant issues that should be addressed and the degree to which they should be addressed in the development of an Environmental Impact Statement
secondary impact: an impact indirectly resulting from an action (i.e., increased development in an area after access to the area is improved)
service level: a measurement of how well a highway is handling traffic; what speeds, delays and restrictions to traffic flow exist
suspended solids: small particles of solids that do not readily settle out of water (i.e., clay particles)
thirtieth highest hourly volume: a standard design criteria derived from the 30th highest of all hourly volumes ranked from low to high
total suspended particulates (TSP): a measure of the concentrations of particulates held in suspension in a specified volume of air. TSP is a commonly used measure of air quality.
trace: a barely discernible amount or indication of some quantity

APPENDICES

APPENDIX A: TECHNICAL STUDIES

As part of the preparation of the Environmental Impact Statement/Section 4(f) Evaluation for the Reserve Street project [M 8103(4)], several technical studies were done to provide data on subject areas where insufficient information was presently available. Many of these studies were considered too lengthy and detailed to include in this EIS and are on file and available for review at the Montana Department of Highways office in Helena. A brief description of each of these studies follows.

A. Traffic Studies

Traffic studies were conducted by the firm of Robert Peccia & Associates of Helena from information collected by the firm or provided by the Montana Department of Highways. The consultant collected turning movement counts at eleven intersections along Reserve Street as well as counts of bicyclist and pedestrian traffic. Additional counts to determine the percentage of medium and heavy truck traffic were conducted at three locations on days during three different months. The manual and machine counts and calculations used for the traffic sections of this EIS are on file and available for review.

B. Accident Studies

Accident studies were conducted by Robert Peccia & Associates from accident data made available through the Montana Department of Justice, Highway Traffic Safety Division, and the Montana Department of Highways. These state agencies maintain the Highway Information System (HIS), a computerized summary of accidents and accident details for all major roads and streets in Montana. Additional investigations were conducted to develop accident rates for the various alternatives considered in this EIS.

C. Preliminary Design and Cost Analysis

Preliminary design for the various alternatives was conducted by Robert Peccia & Associates to establish the physical features of each alternative for analysis purposes. These features included capacities, alignment, grades, pavement widths, turning lanes, medians, and storm drainage facilities. Construction costs for each alternative were developed based upon anticipated quantities and unit prices from the Montana Department of Highways bid tabulations. Maintenance costs were estimated using typical maintenance costs for similar urban roadways from the Montana Department of Highways records.

D. Air Quality Analysis

An air quality analysis was conducted by Robert Peccia & Associates using information available from the Air Quality Bureau, Montana Department of Health and Environmental Sciences and existing reports regarding Missoula Valley air quality. A computer model, CALINE3, was utilized by the consultant to predict carbon monoxide levels for each of the roadway alternatives. Predicted levels of total suspended particulates were calculated using methodology developed for the Air Quality Bureau by the Midwest Research Institute. It should be noted that these predicted levels of air pollutants are attributable only to future traffic volumes on Reserve Street. In order to obtain an accurate measure of the impact of each alternative on the air quality of the study area, the predicted pollutant levels of each alternative must be added to background pollutant levels for the Reserve Street area.

E. Noise Analysis

Actual noise level measurements were taken at numerous locations along Reserve Street using Montana Department of Highways noise monitoring equipment. Sound level readings were taken both inside and outside several residences and at the C.S. Porter School. In addition, the consultant utilized the Federal Highway Administration's noise level modeling techniques using existing and projected traffic composition to estimate and compare noise level readings for each alternative.

F. Water Quality Investigations

Water quality studies were conducted by Robert Peccia & Associates using information available from the Montana Department of Health and Environmental Sciences "STORET" data bank and other available sources of local water quality data. The storm drainage analysis was based upon the original design plans developed by the Montana Department of Highways. Estimates of future water quality impacts resulting from the construction of the build alternatives were based upon Federal Highway Administration modeling techniques. Calculations and background information are available for review.

G. Socio-Economic Studies

Socio-economic studies were conducted by Boyer Consulting of Helena, Montana. This firm relied heavily upon personal interviews, census data, and available documentation of social and economic conditions in Missoula. In addition, Montana Department of Highways personnel were extensively consulted regarding right-of-way and relocation impacts.

H. Other Studies

Numerous other technical studies including archaeological and historical research, geology and soils, energy analysis, fish and wildlife, transportation, recreation, etc. were also conducted as part of this EIS. These studies and other background information are available for review at the Montana Department of Highways office in Helena.

APPENDIX B: THREATENED AND ENDANGERED SPECIES CONSULTATION

RECEIVED
FEB 27 1984
ROBERT PECCIA
& ASSOCIATES

Wayne Brewster, Project Leader
U.S. Fish & Wildlife Service
Endangered Species Office
Room 3035, Federal Building
316 N. 26th Street
Billings, MT 59101

February 21, 1984

HPD-MT

Dear Mr. Brewster:

Subject: M 8108(4) Reserve Street, Missoula

The Montana Department of Highways has a consultant contract for the preparation of an Environmental Impact Statement for a proposed highway project.

Reserve Street is a major north-south arterial located on the west side of Missoula which extends from Thirty-Ninth Street to the south end to Interstate 90 at the north end. The portion of Reserve Street that will be addressed in this project is from U.S. 93 to South Third Street.

As required in Section 7(c) of the Endangered Species Act we are requesting from you whether any species listed or proposed as endangered or threatened may be present in the area of the proposed action.

Sincerely yours,

Original Signed by
W. S. DUNBAR

W. S. Dunbar
Project Development Engineer

cc. State 39-GLL

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
Helena Office
Federal Bldg. U.S. Courthouse
301 South Park
P.O. Box 10023
Helena, Montana 59626

IN REPLY REFER TO:

February 27, 1984

Consultation # 6-1-84-I-016

Mr. W. S. Dunbar
Project Development Engineer
U.S. Department of Transportation
Federal Highway Administration
301 South Park
Mail Drawer 10056
Helena, Montana 59626

Dear Mr. Dunbar:

This responds to your February 21, 1984 letter regarding the proposed M 8103(4) Reserve Street Project, Missoula, Montana.

In accordance with Section 7(c) of the Endangered Species Act as amended, we have determined that the following listed and proposed threatened and endangered species may be present in the project area.

Listed Species	Expected Occurrence
Bald eagle (*Haliaeetus leucocephalus*)	Migrant
Peregrine falcon (*Falco peregrinus*)	Migrant

Proposed Species

None

Section 7(c) of the Act requires that you conduct and submit to the FWS a biological assessment to determine the effects of the proposed project on listed and proposed species. If not initiated within 90 days, the list should be verified with the FWS prior to initiation of the assessment. The biological assessment should be completed within 180 days of initiation, but can be extended by mutual agreement between your agency and the FWS. The assessment conducted pursuant to Section 7(c) may be undertaken as part of your agency's compliance with the requirements of Section 102 of NEPA and incorportated into the draft EIS.

Upon completion of your assessment, if you determine that the project will affect any of the above listed species, formal consultation with the FWS through my office should be intiated. If you determine that any proposed species may be affected, an informal conference with my Endangered Species Team should be initiated to discuss measures that can be taken for their conservation. Section 7(d) of the Act requires that during the consultation process, the Federal agency and the permit or license applicant shall not make any irreversible or irretrievable commitment of resources which would preclude the formulation of reasonable and prudent alternatives.

Please contact us if we can be of further assistance.

Sincerely,

Dale R. Harms
Acting Field Supervisor
Endangered Species

DEPARTMENT OF HIGHWAYS

STATE OF MONTANA

HELENA MONTANA 59620

March 6, 1984

RE: M 8103(4)
Reserve Street
U.S. 93 to 3rd St

Dennis Flath
Non-Game Wildlife Biologist
Box 5, Research Park Building
Montana State University
Bozeman, MT 59717

Dear Dennis:

Attached is a draft Endangered Species Assessment on the Reserve Street Project in Missoula. This project involves reconstruction of approximately 2 miles of roadway on the west side of Missoula from U.S. 93 to So. 3rd Street. The existing road is two lane; the reconstruction will involve widening to four lanes.

Sincerely,

Paul A. Garrett

Paul A. Garrett
Fish & Wildlife Biologist

PAG/pz/21
Attachment

cc: Consultant Design, w/attach
file

ENDANGERED SPECIES ASSESSMENT

Although the general geographic location of the Reserve Street project is within the known range of both the bald eagle (Haliaectus leucocephalus) and peregrine falcon (Falco peregrinus), the area is highly urbanized and has little or no value as wildlife habitat for these or other known endangered species. Migratory patterns of the bald eagle are known to follow the Clark Fork River. However, this project will not impact the river environment or drainage.

PAG/pz/2J

MONTANA

DEPARTMENT OF

FISH, WILDLIFE AND PARKS

Wildlife Research Bureau
Box 5, MSU Campus
Bozeman, MT 59717-0001
March 9, 1984

Mr. Paul A. Garrett
Fish and Wildlife Biologist
Montan Dept. of Highways
2701 Prospect
Helena, MT 59620

M 8105 (4)

Dear Paul,

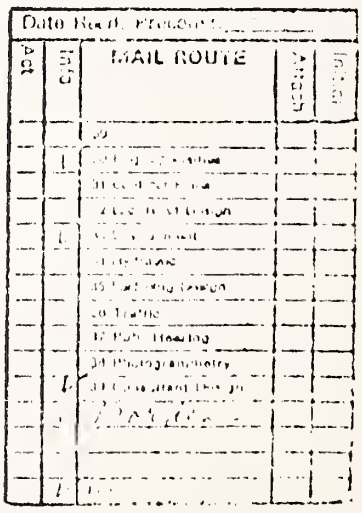
This letter responds to the draft Endangered Species Assessment on the Reserve Street Project in Missoula.

I concur with the assessment that the proposed project will have no effect on any endangered species.

Sincerely,

Dennis L. Flath
Nongame Biolgist

DLF/mkm

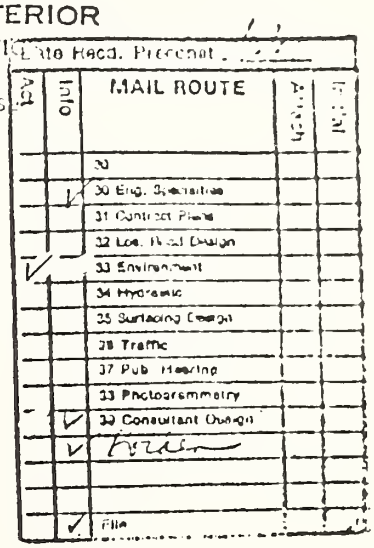


UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE

Helena Office
Federal Bldg. U.S. Courthouse
301 South Park
P.O. Box 10023
Helena, Montana 59626

IN REPLY REFER TO:

March 12, 1984



Mr. Paul A. Garrett
Fish and Wildlife Biologist
Department of Highways
State of Montana
2701 Prospect
Helena, Montana 59620

Dear Mr. Garrett:

We have reviewed your biological assessment for the Reserve Street (M 8103(4)) Project in Missoula, and concur with your determination that the project will not affect the endangered bald eagle (Haliaeetus leucocephalus) or peregrine falcon (Falco peregrinus).

The Environmental Impact Statement should reference the requirements of Section 7 (c) of the Endangered Species Act as amended and include the results of this consultation.

We appreciate your efforts to conserve endangered species and their habitats.

Sincerely,

Dale R. Harms
Acting Field Supervisor
Endangered Species

cc: Ecological Services, Billings, MT

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COMMENTS AND COORDINATION

COMMENTS AND COORDINATION

A. OPPORTUNITIES FOR COMMENTS

Recognizing that this project is of interest to many people in the Missoula area, a number of opportunities for comment were provided at both an early stage and throughout the development of this EIS. The major public notices, meetings and opportunities for comment are listed as follows:

* Notice of Intent to Conduct an EIS published in the Federal Register on September 2, 1983.

* Scoping meetings to discuss the significant issues to be addressed in the EIS held during the afternoon and evening of September 22, 1983.

* Meetings to discuss alternatives that were identified and considered appropriate for the project held during the afternoon and evening of November 16, 1983.

* Meetings on preliminary findings for some of the technical studies held during the afternoon and evening of February 8, 1984.

In addition to these opportunities for comment, a public hearing on the Draft Environmental Impact Statement (DEIS) is scheduled to be held in August, 1984. At this hearing the content, conclusions and recommendations of the DEIS will be presented and comments received. The date, time and location of the public hearing will be advertised in the local news media, and comment procedures will be specified.

B. PUBLIC COMMENTS

As a result of the public workshop sessions and the evening meetings held in September and November, 1983 and February, 1984, more than fifty comments on the project have been received. The majority of these comments were received after the September, 1983 meetings which were held to solicit input to help identify significant and non-significant issues. The primary concerns expressed by the participants at the

scoping meetings included noise impacts on the residential areas of Reserve Street; air pollution (dust); excessive truck traffic; overall traffic safety; pedestrian and bicyclist safety; and socio-economic impacts due to construction such as land use changes and the impacts on property values.

Comments received after the alternatives were presented at meetings in November, 1983 and February, 1984 generally specified a preferred roadway design. The majority of all comments (oral and written) were supportive of the four-lane alternatives; however, very few comments specified a preferred roadway width. Supplemental comments reiterated previous concerns about noise, traffic safety, right-of-way acquisition, and project cost-effectiveness.

C. PUBLIC AGENCY COMMENTS AND COORDINATION

Several federal agencies were invited to be cooperating agencies for this project because of jurisdiction over elements of the EIS or special interest in important areas of study to be included in this report. The agencies that were invited to be cooperating agencies included:

U.S. Department of Housing and Urban Development
U.S. Environmental Protection Agency

Although these federal agencies did not participate as cooperating agencies for this project, review comments will be solicited from each and incorporated into the EIS. Comments have been received from the U.S. Department of the Interior, Fish and Wildlife Service regarding Section 7(c) of the Endangered Species Act, and have been incorporated into the draft EIS.

The State Historic Preservation Officer assisted in evaluating the existing cultural resources in the project area, and in making the determination that the project would have no effect on these resources. The Montana Department of Fish, Wildlife and Parks was also consulted, and determined that the proposed project would not conflict with any Department interests. These state agencies, along with several others, are expected to provide reviews, comments, and technical information through the development of the EIS.

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